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DREDGED MATERIAL RESEARCH PROGRAM

HABITAT DEVELOPMENT FIELD INVESTIGATIONS BUTTERMILK SOUND MARSH DEVELOPMENT SITE ATLANTIC INTRACOASTAL WATERWAY, GEORGIA

APPENDIX A: PROPAGATION OF MARSH PLANTS AND POSTPROPAGATION MONITORING

by

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Brunswick, Ga. 31520

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31 August 1978

SUBJECT: Transmittal of Technical Report D-78-26 (Appendix A)

TO: All Report Recipients

1. The technical report transmitted herewith represents the results of one of a series of research efforts (work units) conducted as part of Task 4A (Marsh Development) of the Corps of Engineers' Dredged Material Research Program (DMRP). Task 4A was part of the Habitat Development Project (HDP) and had as its objective the development and testing of concepts for and determining the environmental and economic feasibility of using dredged material as a substrate for marsh development.

2. Marsh development on dredged material was investigated by the HDP under both field and laboratory conditions. This report, "Appendix A: Propagation of Marsh Plants and Postpropagation Monitoring" (Work Unit 4A12A), is published relative to Waterways Experiment Station Technical Report D-78-26, "Habitat Development Field Investigations, Buttermilk Sound Marsh Development Site, Atlantic Intracoastal Waterway, Georgia; Summary Report" (4A12A). Appendix A provides a detailed discussion of the chemical and biological aspects of marsh habitat development studies conducted at Buttermilk Sound from 1975 until 1977. Its purpose was to establish and monitor marsh vegetation at the Buttermilk Sound Habitat Development Site and to evaluate the impact of habitat development on soil properties, plants, microbial development, aquatic biota, and wildlife.

3. A total of nine marsh development sites were selected and designed by the HDP at various locations throughout the United States. Six sites were subsequently constructed. Those, in addition to Buttermilk Sound, include: Windmill Point on the James River, Virginia (4A11); Apalachicola Bay, Apalachicola, Florida (4A19); Bolivar Peninsula, Galveston Bay, Texas (4A13); Pond #3, San Francisco Bay, California (4A18); and Miller Sands, Columbia River, Oregon (4B05). Detailed design for marsh restoration at Dyke Marsh on the Potomac River (4A17) was completed, but project construction was delayed in the coordination process. Marsh development at Branford Harbor, Connecticut (4A10) and Grays Harbor, Washington (4A14) was terminated because of local opposition and engineering infeasibility, respectively.

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4. Evaluated together, the field site studies plus ancillary field and laboratory evaluations conducted in Task 4A establish and define the range of conditions under which marsh habitat development is feasible. Data presented in the research reports published under this task will be synthesized in the technical reports entitled "Upland and Wetland Habitat Development with Dredged Material: Ecological Considerations" (2A08), and "Wetland Habitat Development with Dredged Material: Engineering and Plant Propagation" (4A24).

JOHN L. CANNON
Colonel, Corps of Engineers
Commander and Director

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

A field study to test the feasibility and impact of developing a marsh on dredged material was initiated in 1975 at Buttermilk Sound, near the mouth of the Altamaha River, Glynn County, Georgia. The 2-ha island, ~~is~~ in the Atlantic Intracoastal Waterway, ~~and~~ is an area of dredged material disposal for maintenance dredging of the waterway. This report presents ~~the~~ results of habitat development activities between spring 1975 and fall 1977 and is Appendix A to the Buttermilk Sound marsh development site summary report. (Continued)

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20. ABSTRACT (Continued).

The site was graded to a 3.7 % ~~percent~~ slope and partitioned into three elevation zones which were subjected to tidal inundation less than 6 hours each day, 6 to 18 hours each day, and more than 18 hours each day, respectively. Each zone was treated with a combination of experimental plantings including seven marsh plant species, two forms of propagule, and five patterns of fertilizer application. The plants were monitored for their response to fertilizer and inundation levels. Within the plots, interstitial water chemistry, soil chemistry, soil microbiology, and invading plant species were monitored. Aquatic biota and wildlife observations were made. Also included are Appendices B-I which include: Graphic representation of Buttermilk Sound Dependent Variables; Graphic Representation of Root to Shoot Ratios and Integrated Biomass; Correlation Matrix for Buttermilk Sound for Dependent Variables; (and) Spartina alterniflora Transplantation; Interstitial Water [illegible] Bird Species and Numbers of Individuals [illegible]

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PREFACE

The work described in this report was conducted under Contract No. DACW21-75-C-0074 between the U. S. Army Engineer District, Savannah, Georgia, and the University of Georgia Marine Extension Service, Brunswick, Georgia. The research was conducted as part of the Dredged Material Research Program (DMRP) sponsored by the Office, Chief of Engineers, U. S. Army, and monitored by the Environmental Laboratory (EL), U. S. Army Engineer Waterways Experiment Station (WES), Vicksburg, Miss.

The authors of the report were Dr. Robert J. Reimold, Mr. Michael A. Hardisky, and Mr. Patrick C. Adams (deceased).* Mrs. Kathy Smith, Mr. James Kowalchuck, Ms. Christine Langner, Mr. Stephen Pittman, Ms. Susan Gallagher, Mr. Ray Chauncey, and Mrs. Brenda Tillman assisted with the research. Dr. Roger Hanson and Mr. Tracy St. Onge conducted the microbial studies.

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Directors of WES during the conduct of the study were COL G. H. Hilt, CE, and COL John L. Cannon, CE. Technical Director was Mr. F. R. Brown.

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APPENDIX H: BUTTERMILK SOUND PLANT INVASION*

APPENDIX I: BIRD SPECIES AND NUMBERS OF INDIVIDUALS OBSERVED BY SAMPLING PERIOD*

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PART I: INTRODUCTION

1. Ecosystem management frequently involves the initiation of baseline studies to establish a data base, and then the implementation of mitigation measures relative to environmental changes. Impact assessment procedures often fail to utilize knowledge previously gained to lessen or mitigate environmental damages. The purpose of this report is to focus on the use of dredged material for the construction of wetland habitat and to evaluate the ecosystem that evolves.

2. Dredging, the excavation of sediment from waterways or other aquatic systems and its movement to other land or water discharging sites, is conducted to maintain, extend, or improve our nation's waterways or to provide aggregate materials for construction. In some instances, dredged material disposal causes significant environmental disturbance. Dredged material management deals with the numerous problems associated with implementing methodology to minimize or eliminate where possible, adverse environmental effects. There are two options for disposal of the material: either on land or in open water. Both disposal options may involve environmental damage, depending upon the amount of material disposed, the characteristics of the material, and the location and timing of disposal.

3. The Dredged Material Research Program (DMRP), U. S. Army Corps of Engineers Waterways Experiment Station, has been conducting a research program for the Office, Chief of Engineers, on the alternatives for the disposition of dredged material. Included in the objectives of this program are determination of the environmental effects of dredging and disposal operations and development of environmentally and economically feasible disposal alternatives.

4. One component of the DMRP is the Habitat Development Project which is aimed at developing viable wildlife habitat using dredged material as a substrate. Since significant areas of marshes have been filled as a result of dredged material disposal, the creation of additional wetland habitat appears to be a desirable alternative in some areas. The intent of this report is to focus on habitat creation in a

brackish water marsh in Buttermilk Sound, Glynn County, Georgia, using dredged material from maintenance of the Atlantic Intracoastal Waterway (AIWW).

PART II: SITE DESCRIPTION

Location

5. The Buttermilk Sound Habitat Development site was located in the AIWW near the mouth of the Altamaha River, Glynn County, Georgia, (Figure 1). The site was a 2.1 ha area representing 5 to 7 years of dredged material disposal.

Marsh Substrate

6. Most of the area surrounding the site consisted of tidal salt marshes and small high ground hammocks some of which were remnants of dredged material disposal and rice farm diking. Daily tidal inundation caused the surface layers of these marshes to build up very slowly by deposition. There was also a shifting of materials caused by strong tidal currents associated with the 2.1 m average tidal regime flooding the marshes twice daily (Reimold and Adams 1974). Many small creeks and rivulets cut through these marsh areas.

7. There was little variation in soil composition of nearby tidal marshes. Generally, the surface layer was a mixture of light yellow-brown (10 YR 6/4) to grayish-brown (10 YR 5/2) plastic clay (soil colors were based on the Munsel Color Code, Munsel, 1973). The surface layer was mildly alkaline (pH 7.0 to 8.0) and contained large quantities of plant roots. The subsurface layer was generally a grey (N 5/0) plastic clay with many dark reddish brown (5 YR 3/3) streaks containing whole or partly disintegrated marsh grasses and rushes (Soil Conservation Service, 1961).

Vegetation

8. Vegetation commonly found in the tidal salt marshes adjacent to the site is presented in Table 1. A general vegetation map of the

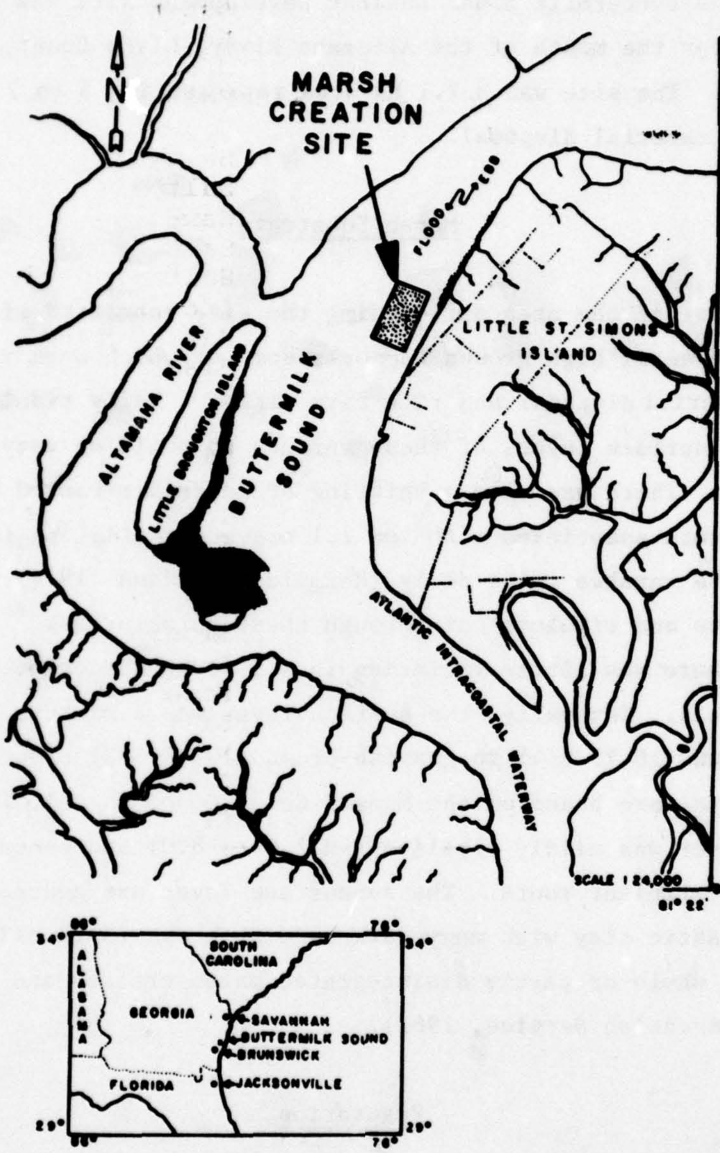


Figure 1. Location of the Buttermilk Sound Marsh Habitat Development Site.

TABLE 1. Plants Common to Tidal Marshes Adjacent to the Buttermilk Sound Habitat Creation Site.

SCIENTIFIC NAME	COMMON NAME
Aster subulatus	Aster
Aster tenuifolius	Aster
Atriplex patula	Orach
Baccharis angustifolia	False-willow
Baccharis halimifolia	Silverling
Batis maritima	Saltwort
Borrichia frutescens	Saltmarsh ox-eye
Cladium jamaicensis	Saw-grass
Distichlis spicata	Salt grass
Fimbristylis castanea	Saltmarsh fimbristylis
Iresine rhizomatosa	Iresine
Iva frutescens	Marsh elder
Juncus roemerianus	Black needle rush
Limonium Nashii	Sea lavender
Salicornia bigelovii	Samphire
Salicornia europaea	Glasswort
Salicornia virginica	Woody glasswort
Scirpus americanus	Three-square
Scirpus robustus	Saltmarsh bullrush
Solidago sempervirens	Seaside goldenrod
Solidago tenuifolia	Narrow leaf goldenrod
Spartina alterniflora	Smooth cordgrass
Spartina bakeri	Bunch cordgrass
Spartina cynosuroides	Rough cordgrass
Spartina patens	Salt hay
Sporobolus virginicus	Marsh dropseed
Typha domingensis	Cattail
Zizaniopsis miliacea	Southern wild rice

area (Figure 2) revealed that *Spartina alterniflora* was the most common species occuring in the lower elevation areas of the tidal marsh. Along the creek banks, where the tides inundated the plants twice daily, *Spartina alterniflora* grew to heights of several m.

9. At the upper daily tidal inundation elevations in the marsh, *Spartina alterniflora* was shorter and the standing crop biomass was much less than that of the taller growth form (Reimold et al. 1975). Although the biomass of the aerial parts of the high marsh *Spartina alterniflora* was less, the underground biomass was considerably greater than on the creekbank (Gallagher et al., in press). At marsh elevations associated with spring tides, several other marsh plant species were better adapted to the sandier, lower salinity soils including *Spartina cynosuroides, Juncus roemerianus, Borrichia frutescens,* and *Scirpus robustus*. The transition zone between the marsh and the high ground was often marked by a zone of herbaceous plants such as *Distichlis spicata, Spartina patens, Sporobolus virginicus* and the shrubs *Iva frutescens* and *Baccharis halimifolia*.

10. Figure 3 depicts the location of vegetation found on the site prior to grading. There was very little vegetation on the site and aerial coverage of vegetation was less than 1 percent of the total area.

Site Substrate

11. A profile of the site material revealed a homogeneous quartz sand to a depth of three m. Six cores were taken to a depth of 60 cm between the mean high water and mean low water level to assess quantitative differences in relation to tide level. Each core was halved for chemical and physical analysis. The substrate consisted of 99 percent quartz sand (by weight) with no visible stratification. Table 2 provides a summary of classification of hue, value and chroma for each core segment. Table 3 summarizes the mineral content of the cores and Table 4 provides a summary of chemical analyses.

12. Measurements of salinity, pH and water temperature taken from the water column adjacent to the site (Figure 4) were similar in

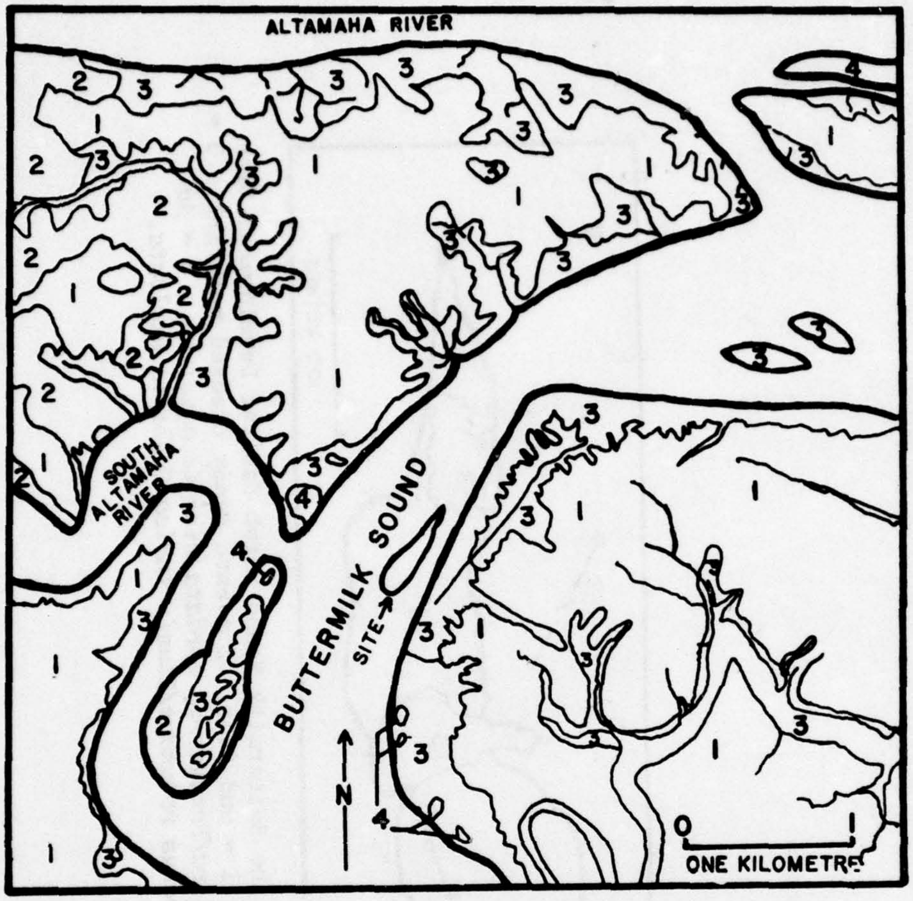


Figure 2. Vegetation map surrounding the Buttermilk Sound Marsh Habitat Development Site. 1 = *Juncus roemerianus*, 2 = *Zizaniopsis miliacea*, 3 = *Spartina cynosuriodes* with *Spartina alterniflora* bordering the waterway, 4 = perturbated areas.

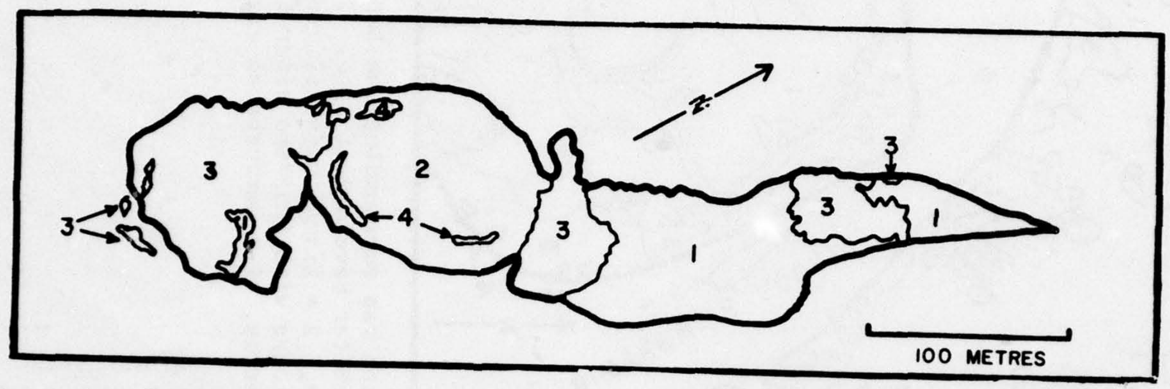


Figure 3. Vegetation map of the Buttermilk Sound Marsh Habitat Development Site prior to grading. 1 = mud flat, 2 = bare sandy dredged material, 3 = *Spartina alterniflora/Pontederia cordata/Zizania aquatica*, 4 = *Acnida cannabina/Cyperus rotundus/Elusin indica/Sesbania exaltata*.

TABLE 2. Physical Analysis of Cores Taken on Buttermilk Sound Habitat Development Site Prior to Grading. Color Hue, Value, and Chroma are Based on the Munsell System

Core #	Section (cm)	Location*	Hue	Value		Chroma		
1A	0-30	MHW	10 YR	3	/	3	moist	dark brown
1A	31-60	MHW	10 YR	3	/	3	moist	dark brown
1B	0-30	MLW	10 YR	5	/	4	moist	yellowish brown
1B	31-60	MLW	10 YR	4.5	/	3	moist	brown
2A	0-30	MHW	10 YR	3.5	/	3	moist	dark brown
2A	31-60	MHW	10 YR	4	/	3	moist	brown-dark brown
2B	0-30	MLW	10 YR	3	/	3	moist	dark brown
2B	31-60	MLW	10 YR	4	/	3	moist	brown-dark brown
3A	0-30	MHW	10 YR	3	/	4	moist	dark yellowish brown
3A	31-60	MHW	10 YR	4	/	3.5	moist	dark yellowish brown
3B	0-30	MLW	10 YR	3	/	3	moist	dark brown
3B	31-60	MLW	10 YR	3	/	3.5	moist	dark yellowish brown

* MHW = mean high water
MLW - mean low water

TABLE 3. Chemical Analysis of Cores Taken on Buttermilk Sound Habitat Development Site Prior to Grading

Sample No.	pH^W	Eh +Mv	% H_2O	Fe ppm	Cu ppm	P ppm	K ppm	Ca ppm	Mg ppm	CEC meq
1A Top	6.9	410	16.4	52.5	.4	4.0	6.5	63.5	20.5	0.91
1A Bottom	7.0	390	17.7	65.5	.4	4.0	6.5	58.0	21.5	0.89
1B Top	6.9	420	20.0	17.0	.4	2.0	4.5	29.0	14.5	0.28
1B Bottom	7.1	410	21.8	18.0	.4	2.0	4.5	30.5	14.5	0.28
2A Top	7.0	410	16.4	44.0	.4	3.0	6.0	58.5	17.0	0.85
2A Bottom	7.0	380	19.1	45.0	.4	4.0	5.5	63.5	21.0	0.49
2B Top	6.9	350	18.2	27.0	.4	3.0	10.0	44.0	23.5	0.44
2B Bottom	7.1	400	18.5	42.5	.4	4.0	7.5	58.5	21.0	0.48
3A Top	6.9	420	18.6	66.5	.4	8.0	12.5	110.0	28.0	1.22
3A Bottom	6.8	410	20.0	47.5	.45	6.0	8.5	63.5	21.0	0.91
3B Top	7.0	400	17.3	43.0	.4	6.0	12.0	80.5	19.0	0.59
3B Bottom	7.0	409	19.0	37.0	.4	2.0	6.0	59.1	16.5	0.45

% H_2O = percent water content of the core, Fe - iron; Cu - copper, P - phosphorus, K - potassium, Ca - calcium, and Mg - magnesium are all expressed in parts per million; CEC - cation exchange capacity = milliequivalents per 100 g.

TABLE 4. Chemical Analysis of Cores Taken on Buttermilk Sound Habitat Development Site Prior to Grading

Sample No.	Mn ppm	B ppm	S ppm	% OM	Total* N mg/g	NO_3* NO_2 ppm	NH_3* ppm	Total* P mg/g	PO_4* ppm
1A Top	4.5	.25	0.14	0.07	.062	1.39	3.46	0.036	0.10
1A Bottom	5.5	.24	.008	0.07	.052	0.45	3.24	0.026	0.19
1B Top	4.0	.19	.004	0.13	.017	0.40	1.91	0.017	.006
1B Bottom	<4.0	.11	N.D.	0.13	.011	0.58	0.81	0.021	.019
2A Top	6.0	.08	.006	0.13	.045	1.39	2.37	0.033	.049
2A Bottom	<4.0	.08	.008	0.13	.044	0.64	1.57	0.033	.039
2B Top	<4.0	.03	.014	0.07	.033	1.08	6.63	0.031	.149
2B Bottom	4.0	.09	.006	0.07	.046	0.90	1.38	0.033	.058
3A Top	8.0	.13	.004	0.20	.083	1.27	1.59	0.042	.022
3A Bottom	4.0	.13	.008	0.13	.042	0.70	1.05	0.027	.009
3B Top	5.0	.06	.005	0.13	.042	1.07	1.79	0.033	.009
3B	<4.0	.12	N.D.	0.07	.037	0.90	5.16	0.023	.022

Mn - manganese, B - boron, and S - sulfur are all expressed in parts per million, % OM = percent organic matter; Total N = total nitrogen - milligrams per gram, NO_3-NO_2 = nitrate-nitrite - parts per million, NH_3 = ammonia - parts per million, Total P = total phosphorus - milligrams per gram, PO_4 = ortho-phosphate - parts per million.
* = analysis performed in interstitial water.

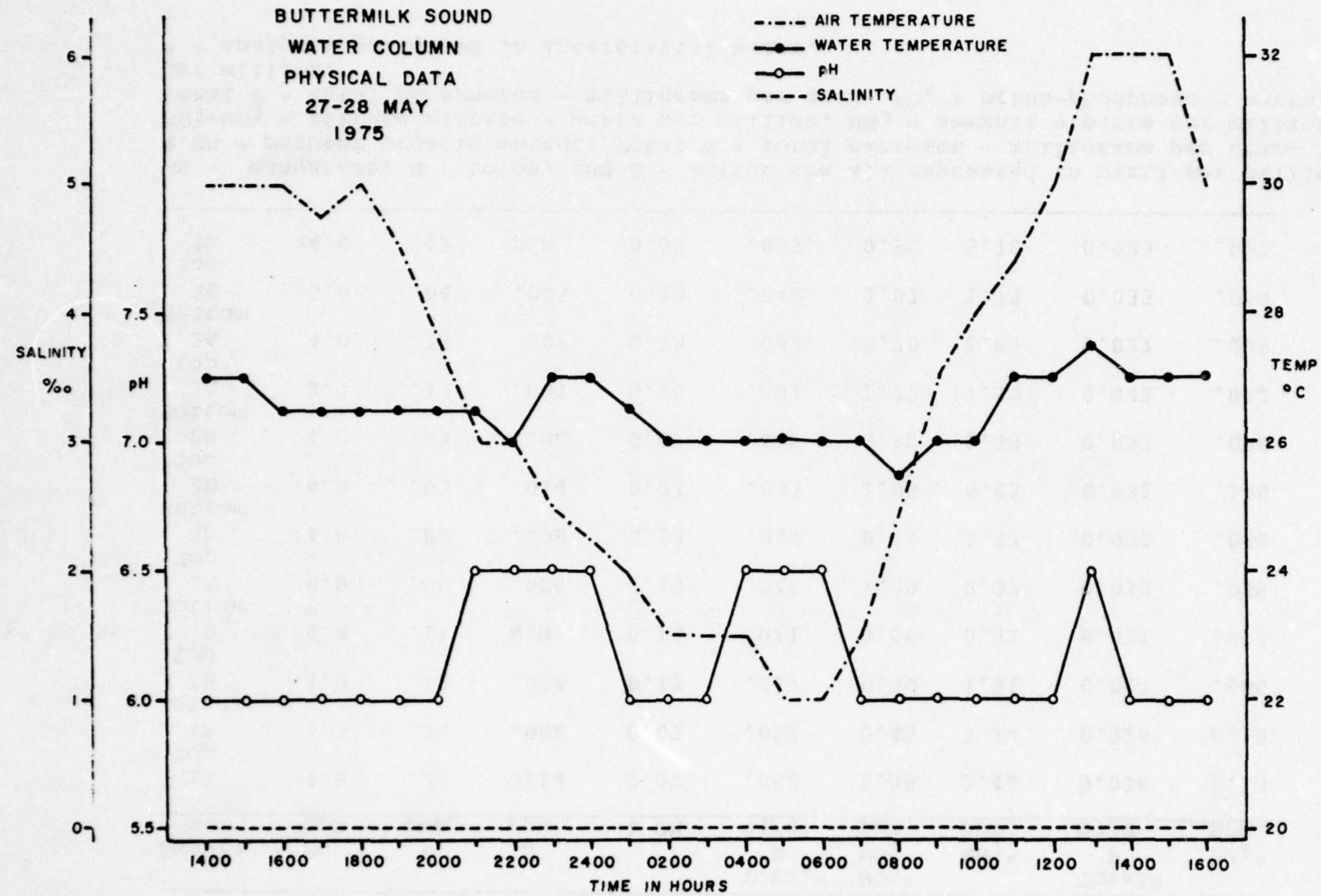


Figure 4. Physical parameter of the tidal water surrounding the Buttermilk Sound site prior to grading.

magnitude to a previous two year study (Pomeroy et al. 1972). The variability of the salinity levels was proportional to the fresh water input of the Altamaha River.

13. During the course of the experiment, the climatic conditions of the Buttermilk Sound estuary were similar to those of the coastal city of Brunswick, Georgia (Table 5). The climate was moderated by air masses which sweep across the area from the south and from the direction of the Alantic Ocean. Hurricanes are not frequent, but occasionally one enters the area causing increases in monthly and annual rainfall averages.

14. One of the major nutrients contained in estuarine waters was phosphorus. Phosphate was required by both plants and microbes for productivity in the estuary. Phosphorus occurred in many forms; the most common and most usble form being the phosphate ion $PO_4^{\equiv}$. This orthophosphate fraction provided a form of phosphorus ready for immediate utilization. The orthophosphate levels for a Georgia estuary monitored by Pomeroy et al. (1972) were similar to the levels existing around the site in 1975 (Figures 5 and 6).

15. Other forms of phosphorus included those associated with particulate matter in the water. Phosphorus bound in organic material was referred to as total particulate phosphorus. Total dissolved phosphorus was the fraction of all inorganic phosphorus forms dissolved in water. These two fractions combined were equivalent to all the phosphorus present in a given sample. Each of these fractions was measured in the waters surrounding the site (Figure7). The total dissolved phosphorus typically remained higher than the particulate phosphorus. The values for the site were slightly lower than those of earlier studies (Figures 5 and 6) (Pomeroy et al. 1972), but this was consistent with the high freshwater input. Fresh waters from river swamps normally have lower nutrient content than the estuarine water systems. During summer months when productivity of *Spartina alterniflora* was at its maximun, the flux of phosphorus through the system was accelerated. This resulted in reduced levels of free phosphorus and increased quanities cycling within the plant communities (Reimold 1972).

16. Nitrogen was another important nutrient in the estaurine ecosystem. Nitrogen has been found to be the major limiting nutrient

Table 5.

Temperature and Precipitation at

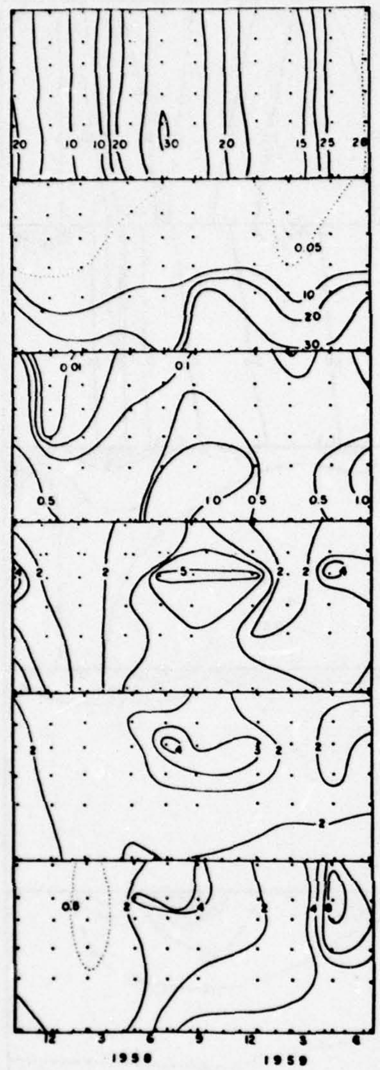
Brunswick, Glynn County, Georgia

Month	Temperature[1]			Precipitation [2]			
	Average	Absolute maximum	Absolute minimum	Average	Driest year (1931)	Wettest year (1953)	Average snowfall
	°C.	°C.	°C.	Centimetres	Centimetres	Centimetres	Centimetres
December	12.9	28.9	-7.2	7.57	7.34	13.82	([3])
January	22.1	28.3	-8.3	7.32	6.58	4.24	([3])
February	13.2	30.0	-10.6	7.19	4.39	9.98	.25
Winter							
March	16.3	37.2	-4.4	8.15	10.29	8.71	0
April	19.9	34.4	1.7	7.82	3.96	15.47	([3])
May	23.7	37.8	6.7	8.33	0.89	1.96	([3])
Spring							
June	27.2	40.0	13.9	14.07	7.03	9.35	0
July	27.8	40.0	17.2	18.90	13.41	29.85	0
August	27.7	39.4	17.2	16.69	15.90	41.58	0
Summer							
September	25.9	38.3	10.6	18.03	7.77	58.06	0
October	21.4	35.0	3.3	9.47	0.71	4.09	0
November	16.1	31.7	-6.1	4.37	2.79	3.94	0
Fall							
Year	20.3	40.0	-10.6	127.91	81.08	201.04	.25

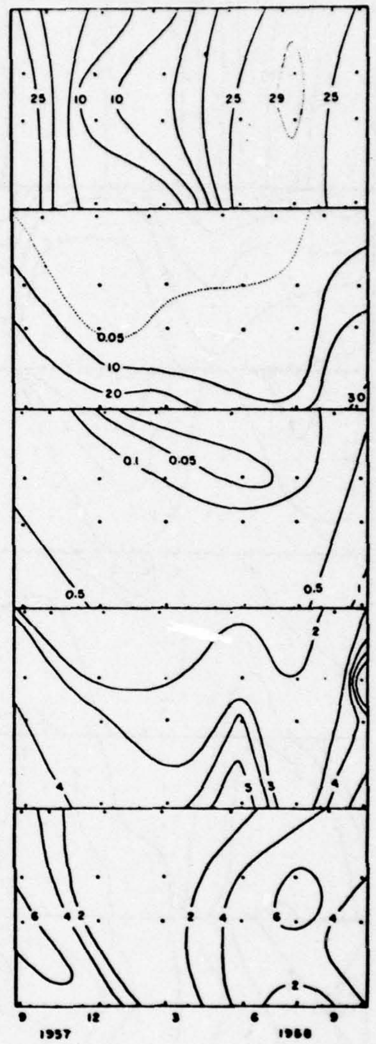
[1] Average temperature based on a 40-year record, through 1955; highest and lowest temperatures on a 50-year record, through 1952.

[2] Average precipitation based on a 55-year record, through 1955; wettest and driest years based on a 55 -year record, in the period 1879-1955; snowfall based on a 44-year record, through 1952.

[3] Trace

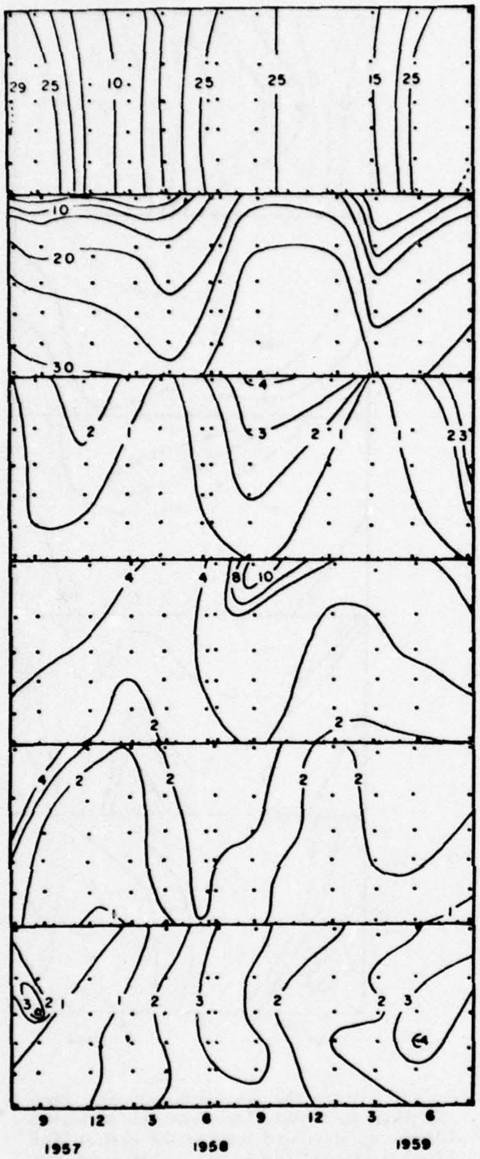


Water chemistry of the South Branch of the Altamaha River and the Hampton River, from freshwater at Butler's Island (top of vertical axis) to the inlet at Sea Island (bottom of vertical axis). The parameters, from top to bottom, are: temperature, °C; salinity, ‰; phosphate, mg-atoms PO_4-P m^{-3}; total phosphorus, mg-atoms P m^{-3}; particulate phosphorus, mg-atoms P m^{-3}; chlorophyll *a*, mg m^{-3}. Horizontal axis is in months.

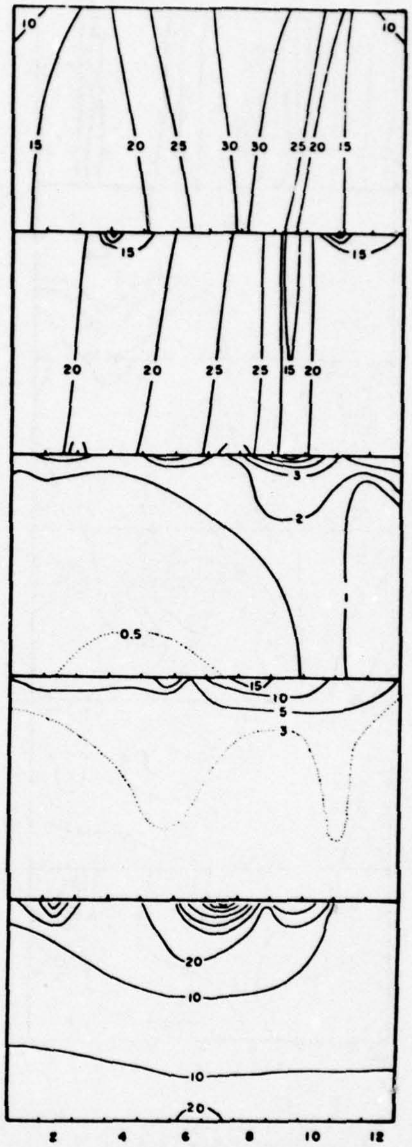


Water chemistry of the Altamaha River and Altamaha Sound, from freshwater at Butler's Island (top of vertical axis) to the inlet at Wolf Island (bottom of vertical axis). The parameters, from top to bottom, are: temperature, °C; salinity, ‰; phosphate, mg-atoms PO_4-P m^{-3}; total phosphorus, mg-atoms P m^{-3}; chlorophyll, mg m^{-3}. Horizontal axis is in months.

FIGURE 5. Water Chemistry from Several Estuaries Near the Buttermilk Sound Habitat Development Site (Taken from Pomeroy, et al., 1972)



Water chemistry of Sapelo Sound, from the head of the Sapelo River at U.S. Route 17 (top of vertical axis) to the inlet at Blackbeard Island (bottom of vertical axis). The parameters, from top to bottom, are: temperature, °C; salinity, ‰; phosphate, mg-atoms PO_4-P m^{-3}; total phosphorus, mg-atoms P m^{-3}; particulate phosphorus, mg-atoms P m^{-3}; chlorophyll, mg m^{-3}. Horizontal axis is in months.



Water chemistry of the Duplin River, from head in marsh to mouth at Doboy Sound (vertical axis). The parameters, from top to bottom, are: temperature, °C; salinity, ‰; phosphate, mg-atoms PO_4-P m^{-3}; total phosphorus, mg-atoms P m^{-3}; chlorophyll, mg m^{-3}. The values are combined from observations over the period 1955/1960. Horizontal axis is in months.

FIGURE 6. Water Chemistry from Several Estuaries Near the Buttermilk Sound Habitat Development Site (Taken from Pomeroy, et al., 1972)

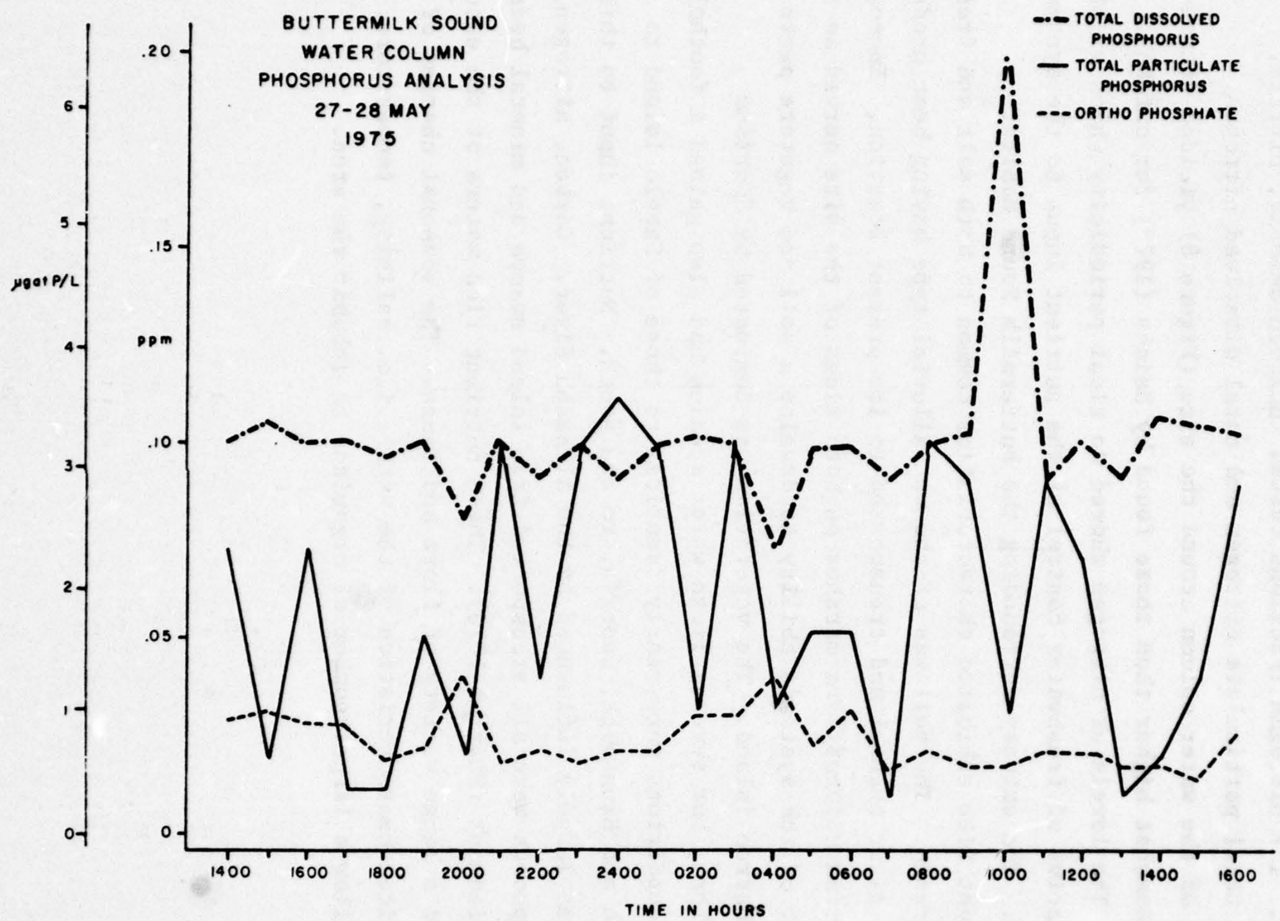


Figure 7. Phosphorus in the tidal water surrounding the Buttermilk Sound site prior to grading.

in coastal waters (Ryther and Dunstan 1971), thus production was directly proportional to nitrogen levels and flux rates through the estuary (Nixon and Oviatt 1973).

17. The nitrogen fractions tested included ammonia, nitrite, nitrate, total particulate nitrogen and total dissolved nitrogen. Analysis of the water column around the site (Figure 8) yielded nitrogen ranges somewhat higher than those found by Haines (1975) for offshore waters. The levels of nitrogen showed no tidal periodicity which might be indicative of freshwater control of the nutrient input to the system.

18. The estuary surrounding the Buttermilk Sound Habitat Development Site exhibited characteristics common to both salt and freshwater marshes. The soil was of the wet alluvial type having been dredged from the river channel and transported to its present location. Encroaching *Spartina alterniflora* marshes on both sides of the site served as an indicator of the system's ability to develop a soil and vegetate parts of this barren island. The vegetation was dominated by *Spartina alterniflora*, but several fresh water species had also gained a foothold. Weather conditions were nearly identical to those of Sapelo Island to the north and Brunswick, Georgia, to the south. Nutrient input to this system was largely influenced by the Altamaha River. Carbon, nitrogen, and phosphorus were all transported from inland swamps and mineral beds of the Piedmont (Wharton 1970). These nutrient rich waters of the estuary supported a large variety of flora and fauna. The seasonal changes of the physical characteristics of the water, i.e. salinity, temperature, and pH allow a larger number of organisns to inhabit the area.

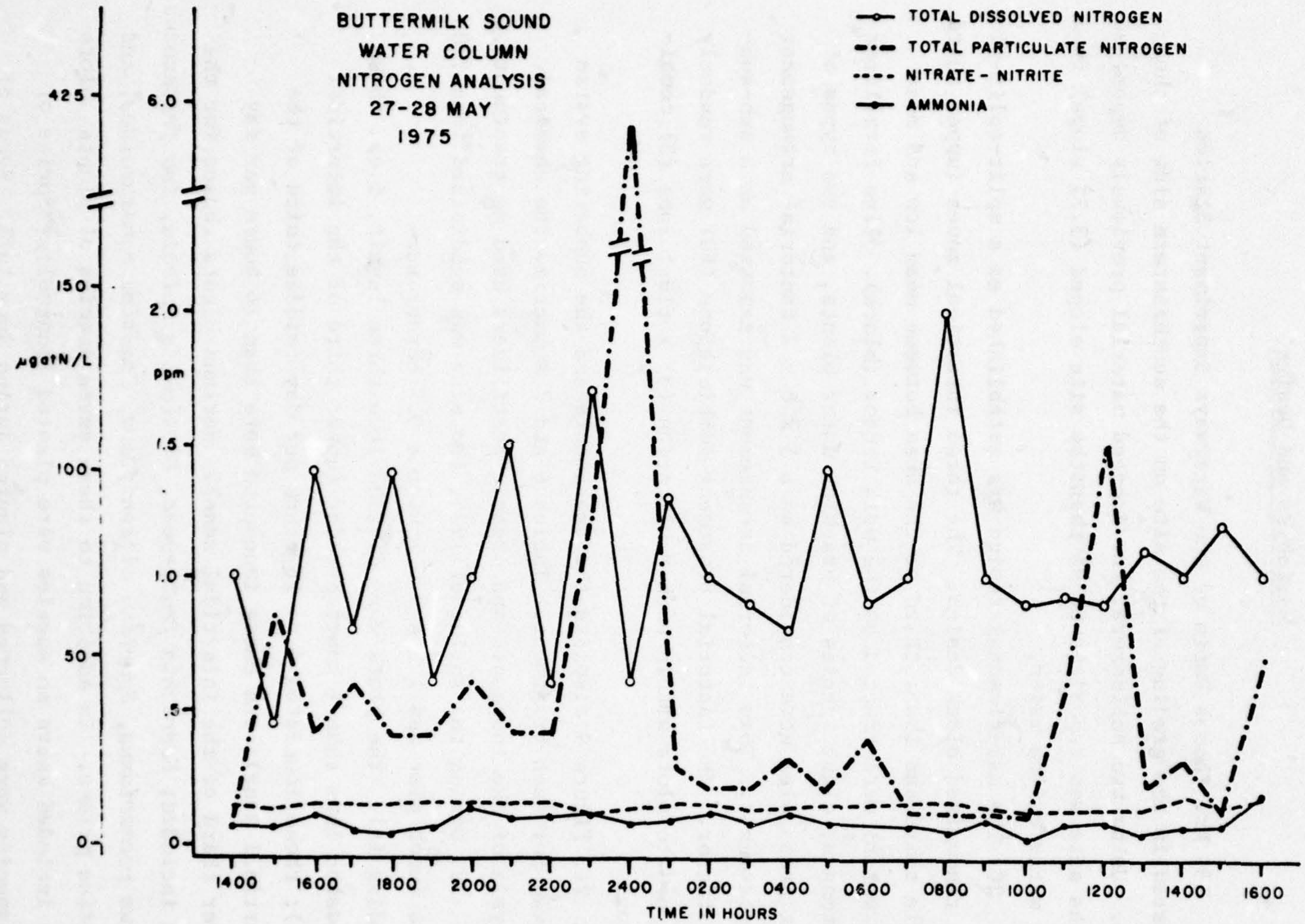


Figure 8. Nitrogen in the tidal waters surrounding the Buttermilk Sound site prior to grading.

PART III: MATERIALS AND METHODS

Variables and Design

19. Mr. Thomas Patin of the Waterways Experiment Station assisted in the grading of the site on the southeastern side of the site. Using two bulldozers, the dredged material previously deposited on the site was repositioned so that the site sloped (3.7% slope) from high water to low water.

20. The experimental design was established as a split-split-plot in a randomized block design. The three intertidal zones (upper third, middle third and lower third of the area between mean low and mean high water) were treated as the main factor (block). Five fertilizer treatments, eight species of brackish water plants, and two types of plant propagules were considered as a 5 x 8 x 2 factorial arrangement of treatments. This factorial arrangement was assessed as a sub-sub-plot factor. The factorial treatment combinations (80) were randomly assigned to plots within each replication (3) x tidal zone (3) combination.

21. Figure 9 displays the treatments and the numbering system derived for each treatment. Tables 6 and 7 summarize the chemical analysis of the inorganic and organic fertilizers used as treatments.

22. During the spring of 1975, the site was subdivided into 720 plots (each plot was 1.5 x 3.0 m with a 0.7 border surrounding it). The plots were divided into three levels, i.e., those inundated less than 8 hours per day (upper third of the intertidal zone); those inundated 8 to 16 hours per day (middle third of the intertidal zone); and those inundated more than 16 hours per day (lower third of the intertidal zone). Wetland plants chosen for the site included: *Borrichia frutescens*, *Distichlis spicata*, *Iva frutescens*, *Juncus roemerianus*, *Spartina alterniflora*, *Spartina cynosuroides*, and *Spartina patens*. In addition to these seven species of plants, plots were included where no species were planted (control). Sprigs of the species were collected and planted during June 1975. Seeds of

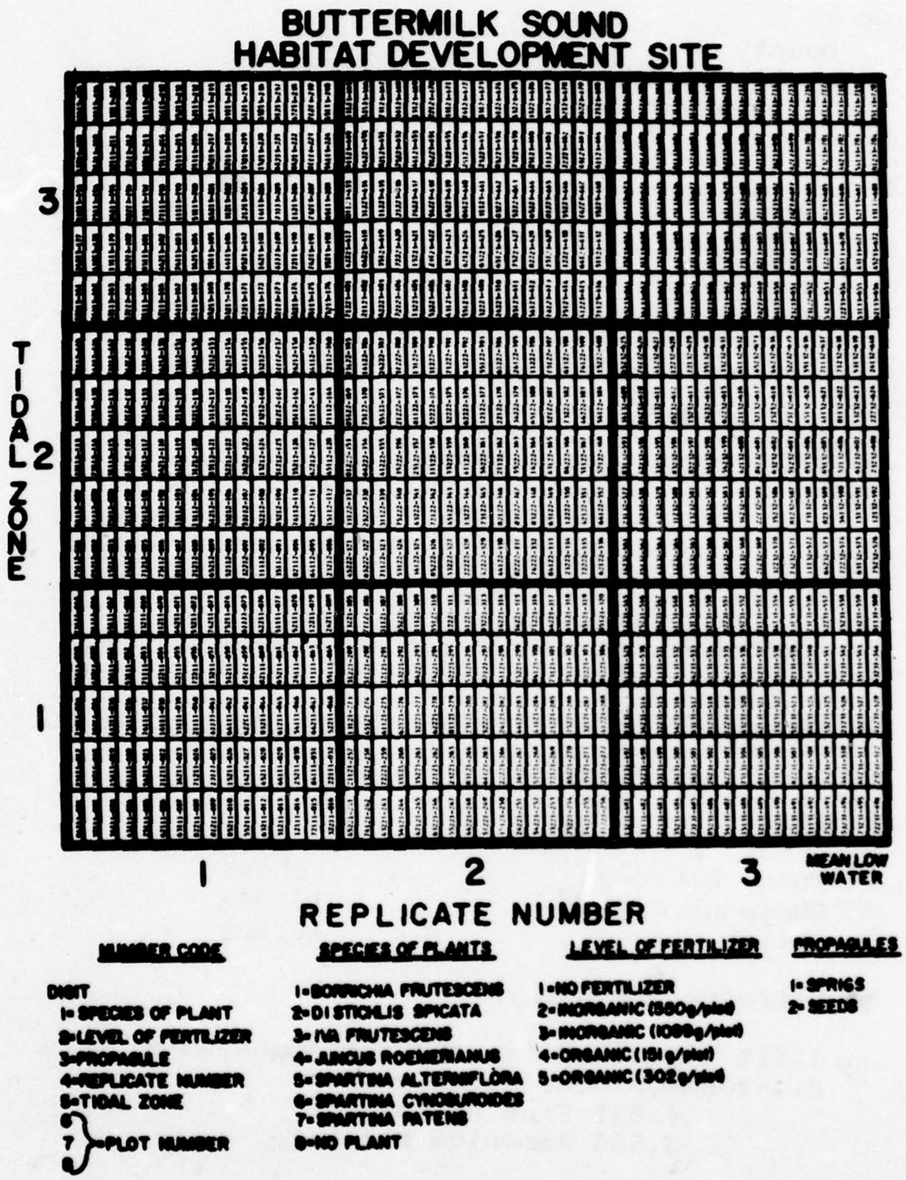


Figure 9. Layout and list of treatments for Buttermilk Sound Marsh Habitat Development Site.

Table 6.

COMPOSITION OF INORGANIC FERTILIZER USED AT BUTTERMILK SOUND

INORGANIC FERTILIZER USED IN PLANTING

Bounty
by Kaiser Agricultural Chemicals
Savannah, Ga. 31402

Analysis

Total Nitrogen	10.00%
Phosphorus	10.00%
Potash	10.00%

Nitrogen Components:

3.0% Nitrate Nitrogen from Ammonium Nitrate
7.0% Ammoniacal Nitrate
- 3.5% Ammonium Nitrate
- 3.0% Ammonia
- 0.5% Ammonium Sulphate

INORGANIC FERTILIZER USED IN SEEDING

Southern States Phospphate and Fertilizer Co.
Savannah, Georgia

Analysis

Total Nitrogen	10.00%
Phosphorus	10.00%
Potash	10.00%

Nitrogen Components:

1.75% Nitrate Nitrogen from Ammonium Nitrate
8.48% Ammoniacal Nitrogen
- 4.93% Free Ammonia
- 3.55% Ammonium Sulphate

Table 7.

COMPOSITION OF ORGANIC FERTILIZER USED AT BUTTERMILK SOUND

ORGANIC

Gro-Tone
by Kerr-McGee Chemical Corp.
Jacksonville, Florida 32206

GUARANTEED ANALYSIS

Total Nitrogen	16.00%
Nitrate Nitrogen	1.19%
Ammoniacal Nitrogen	6.07%
Water Soluble Organic Notrogen	3.00%
Water Insoluble Organic Nitrogen	5.74%
Available Phosphoric Acid	4.00%
Water Soluble Potash	8.00%
Total Available Primary Plant Food	28.00%
Chlorine, not more than	2.00%

Derived From: Nitrate of Soda, Ammonium Nitrate, Sulphate of Ammonia, Urea, Ureaform, Nitroganic Tankage, Di-Ammonium Phosphate, Ammoniated Superphosphate, Superphosphate, Triple Superphosphate, Potassium Nitrate, Sulphate of Potash, Sulphate of Potash-Magnesia.

Statement of Secondary Plant Foods:

Total Magnesium as	Mg	1.05%	MgO	1.75%
Water Soluble Magnesium as	Mg	1.05%	MgO	1.75%
Manganese as	Mn	.77%	MnO	1.00%
Iron as	Fe	1.39%	Fe_2O_3	2.00%
Chelated Iron as	Fe	.027%	Fe_2O_3	.04%

Derived From: Manganese Sulphate, Manganese Oxide, Iron Sulphate, EDTA Ferric or Iron Chelate.

each of the species were collected over the interval from June 1975 through November 1975 and planted during April 1976. The variables measured routinely in every plot were stem density, crab burrow density, root biomass, aerial biomass, flowering stem density, condition and invading species density. Non-routine monitoring included; 1) mineral and nutrient analysis of aerial and root plant tissue 2) physical and nutrient analysis of the substrate and 3) microbial biomass estimation via ATP determination.

Sampling Methods

23. Plant sampling for wet weight, dry weight, and percent dry weight, for both aerial portions and root matter, were conducted according to the methodology established by Reimold and Linthurst (1977). Nekton was monitored according to techniques developed by Reimold and Adams (1973). Nekton samples from Buttermilk Sound were contrasted with samples collected concurrently in the Duplin Estuarine Sanctuary, a neighboring pristine estuary. Diversity, similarity and community analyses of the nekton collected from both Buttermilk Sound and the Duplin, and seine samples collected from Buttermilk Sound only, on a bimonthly basis, were analyzed according to the methods outlined by Reimold et al. (1973). The analyses were based on the community analyses parameters set forth by Odum (1971) and Whittaker (1975). Additional wildlife use of the site was evaluated by trails, tracks and feces (biweekly), nest studies, litter studies (bimonthly), diurnal blind studies and live trapping.

24. Chemical analyses of the soil, water, and plant tissue was conducted using the techniques of Technicon, Inc. (1975). In addition, carbon arc spectrophotometry was utilized to assess the trace elements in plant tissue according to the published techniques of Jones and Warner (1969).

25. In order to quantify the relationships and effects of tidal inundation on the site, a tidal gauge was established at Buttermilk

Sound and data recorded continuously for 28 months.

26. During spring 1975, the U.S. Geological Survey established a temporary bench mark on a dike on Little St. Simons, several hundred m south of the site. This temporary bench mark consisted of a brass rod driven to refusal. From this temporary bench mark, elevations were determined on the site for grading purposes, and a temporary mean low water was estimated for establishing a tidal staff.

27. Statistical analyses of all the data was conducted according to the established techniques of Barr et al. (1976). Table 8 represents the sampling frequency of variables monitored at Buttermilk Sound Marsh Habitat development site.

TABLE 8.

SAMPLING FREQUENCY OF DEPENDENT VARIABLES AT BUTTERMILK SOUND

Sample Date	Stem Density	Crab Burrows	Root Biomass	Aerial Biomass	Condition Index	Flowering Stems	Average Shoot Height	Percent Survival	Basal Area
July 1975 (204)	X	X			X	X			
September 1975 (253)	X	X			X	X	X	X	
November 1975 (309)	X	X	X	X	X	X	X	X	X
January 1976 (007)	X	X			X	X	X		
February 1976 (056)	X	X			X	X	X		X
April 1976 (112)	X	X			X	X	X		X
June 1976 (168)	X	X	X	X	X	X	X		X
August 1976 (224)	X	X			X	X	X		X
October 1976 (280)	X	X	X	X		X	X		X
December 1976 (335)		X			X	X	X		
January 1977 (025)	X	X			X	X			
March 1977 (082)	X	X			X	X			
May 1977 (138)	X	X	X	X	X	X			
July 1977 (194)	X	X				X			
September 1977 (250)	X	X				X			
November 1977 (306)	X	X	X	X	X	X			

The number in parenthesis () is equal to Julian date.

PART IV: WATER CHEMISTRY AND HYDROGRAPHY

Introduction

28. The study area was located at the mouth of the south branch of the Altamaha River. This delta area experiences an average daily 2.1 m tidal range with occasional intrusion of saline waters as determined by the volume of the river flow (Hoese 1967). Pomeroy et al. (1972) found a relatively homogeneous vertical distribution of nutrients in this shallow estuary. Flushing patterns, volume of flow, and total area of the Altamaha delta were described by Pomeroy et al. Also documented was the influence of river discharge upon water chemistry at the Buttermilk Sound site.

29. The turbid estuarine waters contain a variety of components including fine suspended sediment, organic detritus, fecal pellets and living plankton. The high productivity of the estuary utilizes large quantities of phosphorus (Pomeroy 1960, 1963; Reimold 1972) and nitrogen (Windom et al., 1974, Patrick and Delaune 1972), however, the majority of necessary supplies are generated in metabolic turnover of these nutrients rather than by input. Monitoring of available phosphate (PO_4), dissolved and particulate phosphorus, nitrate (NO_3), ammonia (NH_3), dissolved and particulate nitrogen documents the instantaneous quantities in time of each fraction. The purpose of determining nutrient levels of the waters surrounding the experimental area was: 1) to detect any changes which might have resulted from the application of fertilizer or the development of more marsh 2) to describe the water characteristics as they might apply to success or failure of a similar marsh development project. In light of these objectives no attempt was made to duplicate the phosphorous and nitrogen budgets already described for this area.

Methods

30. Monitoring of the characteristics of the water at the site was

conducted hourly for 26 hours (two complete tidal cycles) concurrent with the bimonthly plant evaluation. Physical measurements included pH, redox potential in millivolts (platinum electrode with calomel reference, Pearsall and Mortimer 1939), salinity $^{o}/oo$ (refractometer), water temperature (^{o}C), air temperature (^{o}C), and turbidity (ppm) (Strickland and Parsons, 1965). Chemical determinations included total kjeldahl nitrogen (Van Slyke and Hiller, 1933), nitrate and nitrite (Armstrong, Sterns, and Strickland, 1967), ammonia (FWPCA, 1969), total phosphorus (Technicon #376-75W, 1975), orthophosphate (Technicon #94-70W, 1973) and organic carbon (Strickland and Parsons, 1968). Water samples were collected from the surface using a clean plastic bucket. Physical measurements were taken immediately after sampling using an Orion Ionanalyzer Model 407A and the remaining sample was maintained on ice until returned to the laboratory following the 26 hour period. Chemical analyses of the available nutrient fractions were performed on filtered water samples (Reeve Angel #984H glass fiber filters). Filtered samples for determination of total dissolved phosphorus and nitrogen and unfiltered samples for determination of total phosphorus and nitrogen were prepared. The samples to be digested for total phosphorus and nitrogen determination were frozen until the digestion could be completed (less than one week). All analyses were colorimetric determinations run in triplicate on an Auto Analyzer II System. The mean of each sample was used in statistical analysis. Values were averaged for each 26 hour sampling period and Duncan's Multiple Range test at the 0.05 significance level was used to suggest significant differences.

31. A tidal staff was located on a U.S. Coast Guard service dock for an AIWW range marker, approximately 1300 m from the site. The temporary mean low water was estimated from a U.S. Geological Survey, temporary bench mark established on Little St. Simons Island. Data from the two primary tide stations at Ft. Pulaski, Georgia, and Mayport, Florida, were obtained for the first 18 months of the study from the National Ocean Survey (NOS), Rockville, Maryland, and compared to the data from the Buttermilk Sound gauge using the methods

outlined by Reimold and Adams (1974). Comparisons of simultaneous observations from the three stations were computed for each high and low water for the periods 1 August 1975 through 31 January 1977: mean difference in time (to the nearest one-hundreth hour) of high and low water respectively; mean difference in height (cm) of high and low water respectively; mean height of high water (cm); mean height of low water (cm); mean height of first high water of the day; mean height of second high water of the day; mean height of first low water of the day; mean height of second low water of the day.

Results and Discussion

Hydrography

32. Table 9 depicts the mean heights and statistical parameters of tidal datums for mean high water and mean low water for Buttermilk Sound contrasted with National Ocean Survey primary tide stations adjacent to the site (Fort Pulaski, Georgia, and Mayport, Florida). The tidal range determined from Buttermilk Sound and Ft. Pulaski had nearly the same range for the period of time studied, with 203.42 cm and 202.70 cm respectively. Mayport, Florida, however, had a relatively small tidal range (139.88 cm) which substantiated the fact that tidal ranges were smaller to the south of the Buttermilk Sound site. Although the Ft. Pulaski station and the Mayport station were nearly equidistant from the Buttermilk Sound site, this simultaneous comparison of tidal datums revealed that the tidal datums of Ft. Pulaski could be utilized in lieu of a gauge at Buttermilk Sound for future monitoring purposes.

Physical Properties

33. Analysis of variance for each physical and chemical parameter measured and means groupings by sample date can be found in Appendix A. Particulate nitrogen was the only parameter not exhibiting significant mean differences. Graphs illustrating seasonal and diel fluctuations of the parameters are also found in Appendix A. Changes in air and water

TABLE 9. TIDAL DATUMS OF MEAN HIGH WATER, MEAN LOW WATER, FIRST AND SECOND HIGH WATER, AND FIRST AND SECOND LOW WATER AND STATISTICS FOR ALL STATIONS

	Mean High water (cm.)	Mean Low Water (cm.)	Variance	Standard Deviation	Standard Error	Coefficient of Variation
Ft. Pulaski, Ga.	205.94		753.527	27.450	0.8475	0.1333
		3.29	873.869	29.561	0.9320	8.9763
Mayport, Fla.	143.89		356.507	18.881	0.5986	0.1312
		4.01	657.000	25.632	0.8238	6.3898
Buttermilk Sound, Ga.	224.78		431.913	20.783	0.6844	0.0925
		21.36	589.378	24.277	0.8097	1.1365
Ft. Pulaski, Ga.						
First High Tide	205.25		709.074	26.628	1.1491	0.1297
First Low Tide		2.40	787.064	28.055	1.2350	11.6744
Second High Tide	206.66		803.695	28.350	1.2529	0.1372
Second Low Tide		4.23	965.360	31.070	1.4036	7.3441
Mayport, Fla.						
First High Tide	143.57		332.005	18.223	0.8077	0.1269
First Low Tide		2.64	515.864	22.713	1.0178	8.5940
Second High Tide	144.23		383.913	19.594	0.8888	0.1359
Second Low Tide		5.46	803.865	28.353	1.3078	5.1912
Buttermilk Sound, Ga.						
First High Tide	223.94		404.416	20.110	0.9256	0.0898
First Low Tide		20.10	523.463	22.879	1.0668	1.1383
Second High Tide	225.67		462.503	21.506	1.0138	0.0953
Second Low Tide		22.68	656.382	25.620	1.2228	1.1296

temperature reflected seasonal fluctuations over the 2.5 year sampling period and diel fluctuations during each 26 hour period. Maximum water temperatures averaged 30°C in the summer months and 7°C for the winter months with an absolute minimum of 3.5°C for January 1977. Similar fluctuations were noted for air temperature (Appendix A).

34. Small changes in salinity were noted during a single 26 hour study period. However, mean salinities for each sampling period showed increased salinities during the late summer and early fall. Salinities remained below 2°/oo during the first two years of the study with an increase to 7°/oo during the summer months of 1977. These salinity levels may have accounted for the large influx of fresh and brackish water plant species onto the site as well as the increased invasion by brackish water species of the previously homogeneous *Spartina alterniflora* marshes bordering the study site.

35. The slightly alkaline pH conditions persisted throughout the project duration. No diel or seasonal changes were identified for pH. The redox potential showed no seasonal variation and averaged +220 millivolts or a standard hydrogen electrode mean potential of +460 millivolts (Radiometer, 1966).

36. Turbidity levels were highest during the spring and fall months. Seasonal changes in sediment load, algal blooms or detritus pulses may be factors contributing to the peak periods. Significant differences did exist among means. The 1975 sample periods were significantly less than the 1976-77 period.

Chemical Properties

37. The orthophosphate form of phosphorus is the dissolved, highly reactive form which is maintained in an equilibrium between estaurine sediments and the overlying water body (Hobbie 1976, Pomeroy et al 1968, Reimold 1972). The rapid turnover of orthophosphate supplies the estuarine organisms with an adequate supply of phosphate even though the actual concentration of phosphate is low. The low concentration of orthophosphate recorded by Pomeroy et al. (1972) was low compared to phosphate levels around the Buttermilk Sound site. Seasonal fluctuation showed orthophosphate peaks in fall and winter

with significantly higher means for the fall of 1977 than for any other period.

38. Dissolved and particulate phosphorus (the components of total phosphorus) fluctuated in much the same proportion (particulate phosphorus having a slightly higher concentration than the dissolved fraction) throughout the monitoring period (Figure 10). Total phosphorus peaked in the winter of each year and during the summer of 1976 and 1977. The peak periods of summer and early fall were consistent with Pomeroy's findings however, greater than normal river discharge may have contributed to the higher winter peaks. Only minor increases of phosphorus were recorded on the incoming tide when considering the hourly samples for a 26 hour period (Appendix A).

39. Nitrogen has been determined to be the major limiting nutrient of coastal ecosytems (Ryther and Dunstan, 1971; Windom et al., 1974). The largest peaks of nitrate and nitrite nitrogen occurred during the spring of 1976 and fall of 1977. Slight decreases of available nitrate and nitrite were observed during the summer months when biological activity was greatest. Ammonia nitrogen remained fairly constant until the summer and fall of 1977 when a significant peak was noted for September (Figure 11). Total nitrogen in two forms, dissolved and particulate, showed regular increases during the winter months and lowest concentrations during late summer. The fluctuations in nitrogen levels were associated with river discharge (Windom et al., 1974) and changing demands by the biological community. Windom has suggested that only 20% of the necessary nitrogen input to come from river discharge and the remainder is supplied by turnover of organic detritus. This nitrogen budget would explain the accumulation of nitrogen during the winter months when metabolism is lower. Increased nitrogen levels were sometimes noted on the incoming tide (Appendix A). The concentration of dissolved organic carbon decreased during the winter months, however, the scarcity of sampling dates restricted any formulation of seasonal patterns (Figure 12).

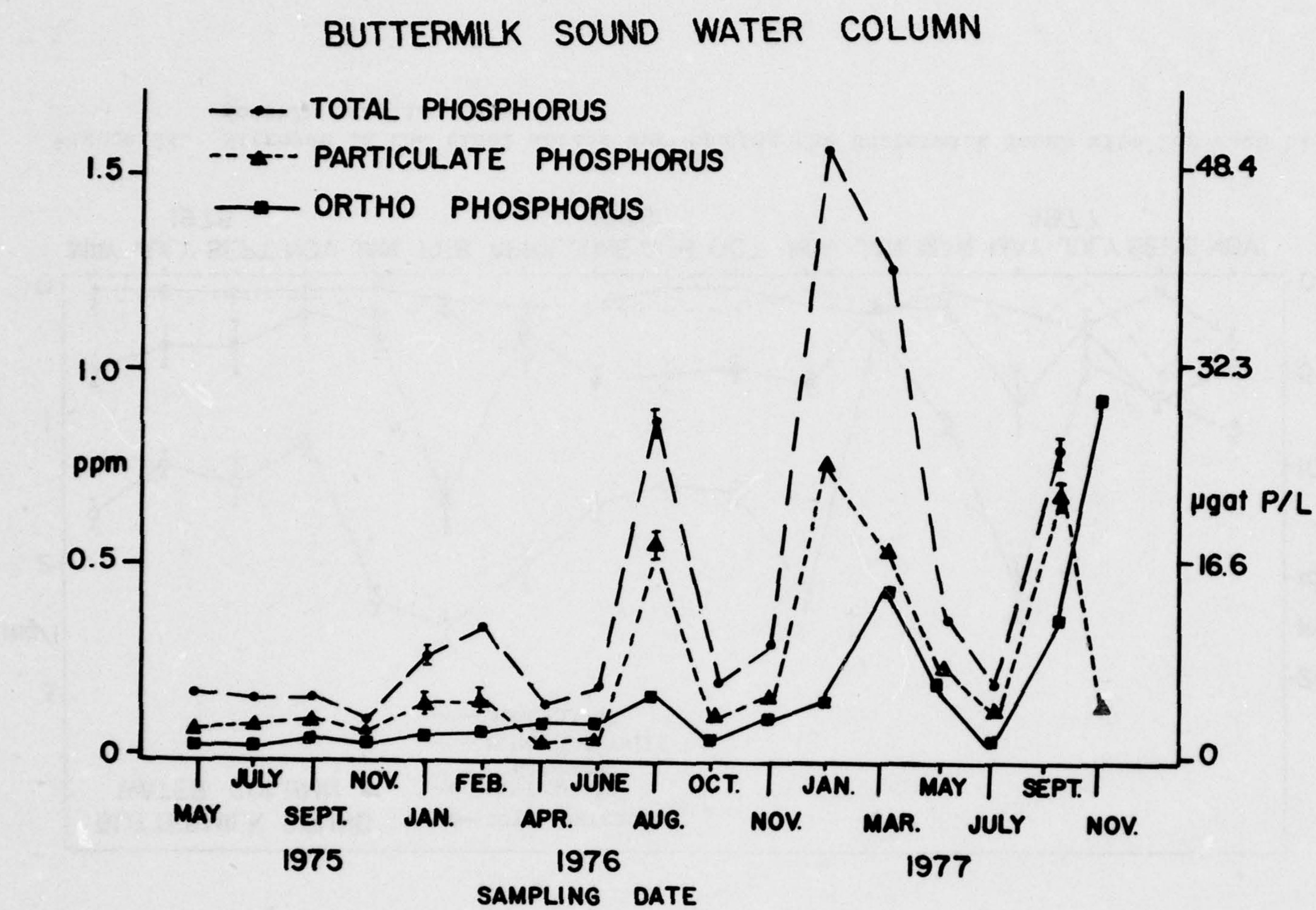


Figure 10. Phosphorus in the tidal water surrounding the Buttermilk Sound site for each bimonthly sampling date.

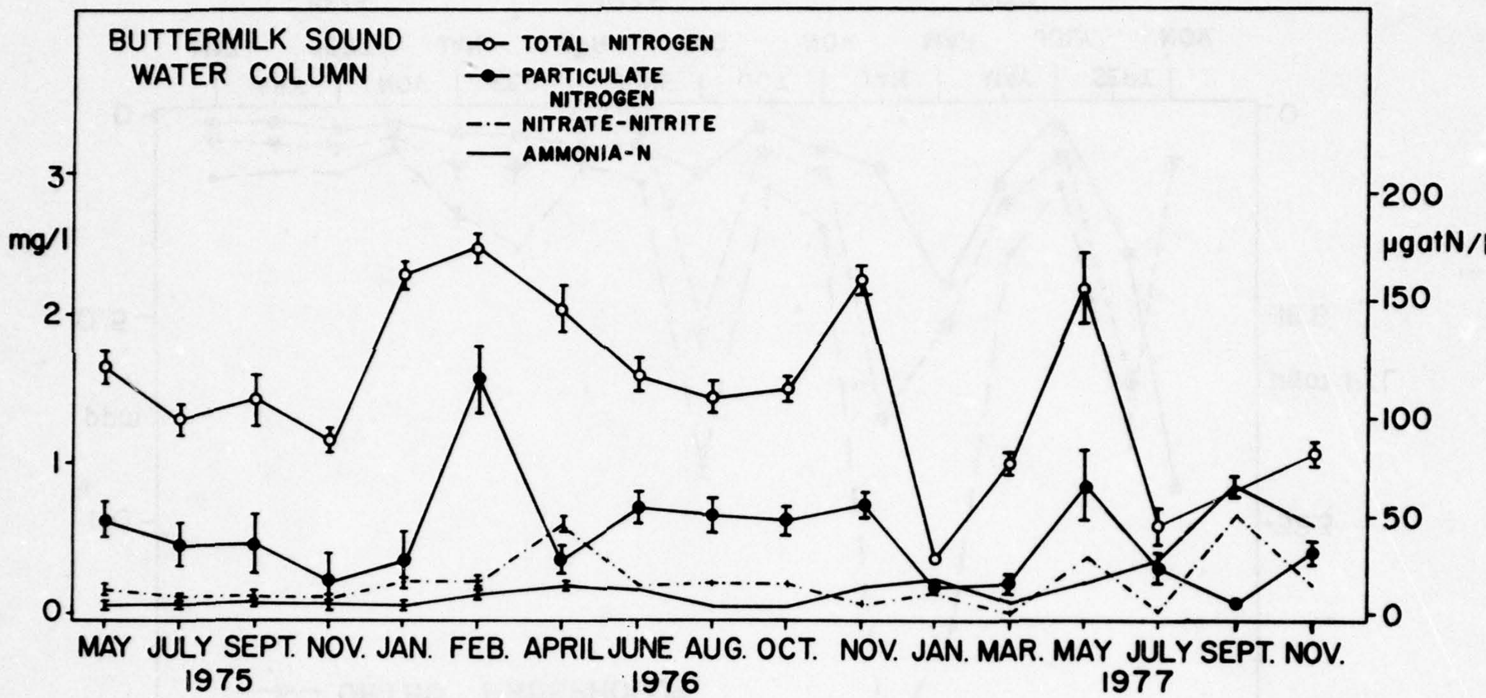


Figure 11. Nitrogen in the tidal waters surrounding the Buttermilk Sound site for each bi-monthly sampling date.

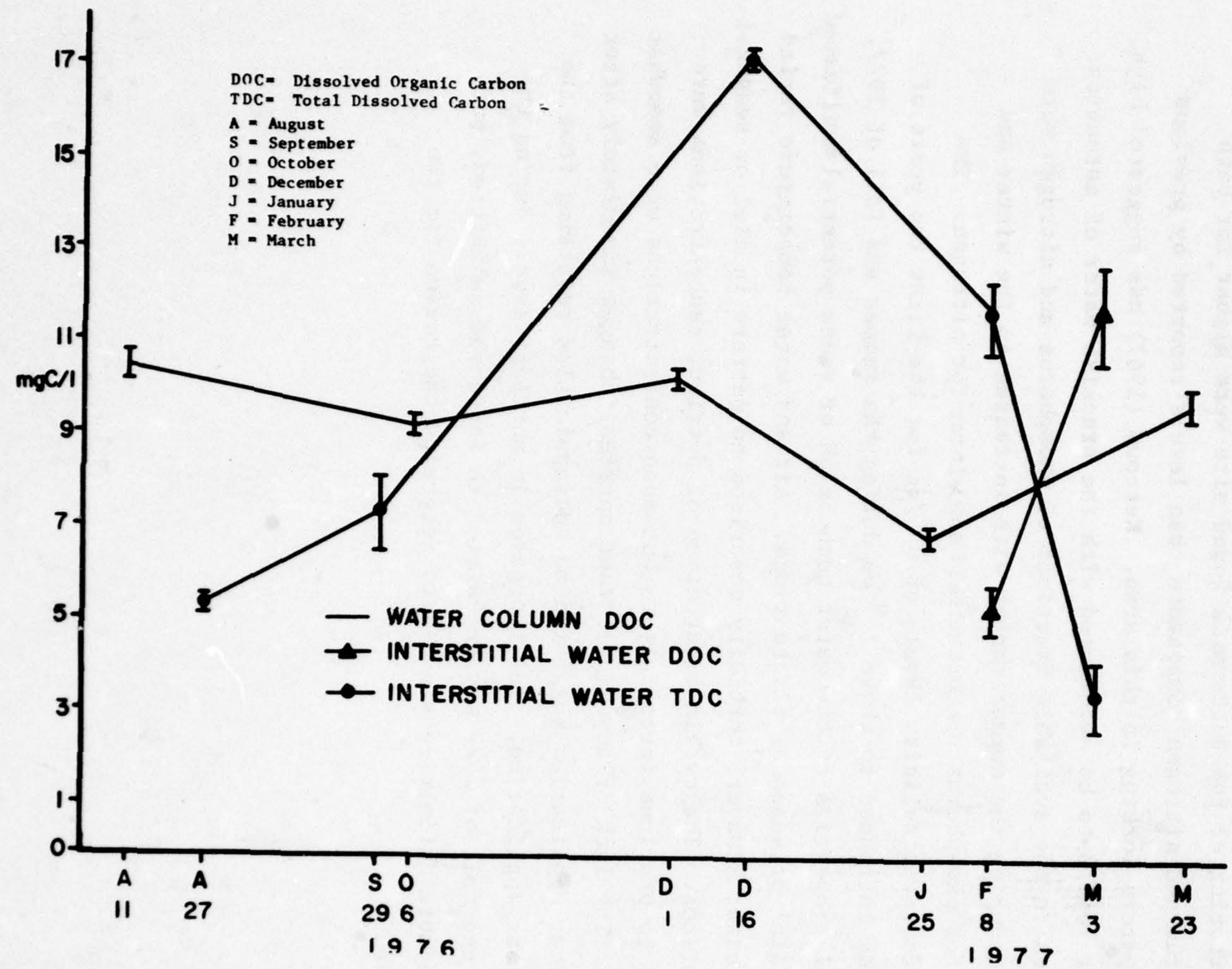


Figure 12. Dissolved organic and total dissolved carbon for Buttermilk Sound water column and interstitial water.

Summary

40. The phosphorus and nitrogen budgets were influenced by the discharge of the Altamaha River. Nutrient levels determined during the monitoring of the Buttermilk Sound site were higher for both phosphorus and nitrogen components than levels reported by previous investigators working in this area. Ketchum (1967) has suggested high nutrient levels to be associated with the brackish water of estuaries. Decreases in the available fractions of phosphorus and nitrogen were detected during the summer months with increases in the winter and spring for phosphorus and in the fall and winter for nitrogen. The nearly constant salinity levels of 0 ^{o}/oo for the first two years of the study increased to above 7 ^{o}/oo during the summer and fall of 1977. Physical properties of the water such as pH or redox potential manifested little diel or seasonal fluctuations. Air and water temperature varied as expected; however, turbidity described no pattern in diel or seasonal fluctuations. The cyclic fluctuation of nutrient concentrations were similar to previous investigators but mean concentrations were somewhat higher. The lack of any significant nutrient changes immediately after fertilizer application suggested no eutrophication resulting from the fertilizer application. The increases in nutrient levels during the summer and fall of 1977 may be related to increased salinities, but require more definitive studies to determine the reason for the increase.

PART V: INTERSTITIAL WATER CHEMISTRY

Introduction

41. The interface of estuarine water and the sediment surface provides a primary source of nutrients to the estuary (Pomeroy et al. 1972, Pomeroy et al. 1965, Oppenheimer and Ward 1963). The release and uptake of various nutrients from the sediment are controlled by differences in soil texture as well as a fluctuating water table (Olson and Watanbe, 1963). Such evidence indicates the sediments to be an important source and sink for many estuarine nutrients.

42. Initially the Buttermilk Sound site was composed of very coarse sand providing low quantities of available nutrients for plant utilization. Accumulation of clay and silt particles and organic matter provided an increased cation exchange capacity and therefore increases in nutrients available in the interstitial water. The oxidized root rhizosphere associated with plant colonization played an important role as the aerobic sandy substrate approached the anaerobic muck associated with *Spartina* marshes. The purpose of measuring the interstitial water associated with the transplantion of marsh plants for this project was primarily to document: 1) changes in the nitrogen and phosphorus levels as soil genesis progressed, 2) changes associated with a particular plant species, and 3) nutrient levels necessary for successful marsh habitat development.

Methods

43. Initially soil wells were constructed using a 35 cm length of 4.4 cm (I.D.) PVC irrigation pipe and affixing a porous ceramic cup manufactured by Soil Moisture Equipment Corporation. Work by Hansen and Harris (1975) suggested a laboratory test of the authenticity of nutrient concentrations of estuarine water inside the soil wells after passing through the porous ceramic tip was necessary. The test showed significant gains in ammonia (0.08 - 0.43 mg/l) and nitrate (0.04 -

0.39 mg/l) as artificial estaurine water (instant ocean) at 5 ^{o}/oo salinity passed through the ceramic tips. An alternate design (used for all sampling) using a 0.13 mm mesh stainless steel wire cloth affixed to the end of the same PVC pipe yielded no variation in nutrient content of estuarine water. The top of each PVC pipe was fitted with a rubber stopper and a 10 cm length of 3.2 mm tygon tubing to act as a "U" tube to allow air to escape from the well during water infiltration. Soil wells were placed in one replicate of *Spartina alterniflora* plots (including all the zones), and in the upper two zones, one replicate each of *Spartina patens* and *Distichlis spicata*. This provided a total of 15 wells for *Spartina alterniflora* and 10 wells each for *Distichlis spicata* and *Spartina patens*. The soil wells were buried to a depth of 25 cm and staked. Many of the soil wells in the lower and middle intertidal zones were washed out as a result of migrating sands. Samples were extracted from the wells using a 40 cm length of tygon tubing attached to a 50 cc disposable plastic syringe (Figure 13). The physical measurements of pH and redox potential were performed immediately (see part IV) and samples were iced during transport to the laboratory.

44. The laboratory chemical analyses were identical to those described in Part IV for water column samples. Samples were collected bimonthly with some monthly samples collected during the spring and summer of 1976. Monthly samples were collected to determine any fertilizer movement via interstitial water following the seeding of plots in April 1976. Sampling included runoff water from two gullies on the site, three soil wells located in adjacent existing *Spartina alterniflora* marshes and a sample of the water column. Each of these three sample controls were compared to the interstitial water of the experimental plots.

45. In late February 1976 a study was conducted to determine the changes in nutrient levels of interstitial water with time during an ebb tide. Each existing soil well was sampled every half hour provided the well contained water, but was not covered by tidal waters. Samples were analyzed and the data was grouped by zones and time for

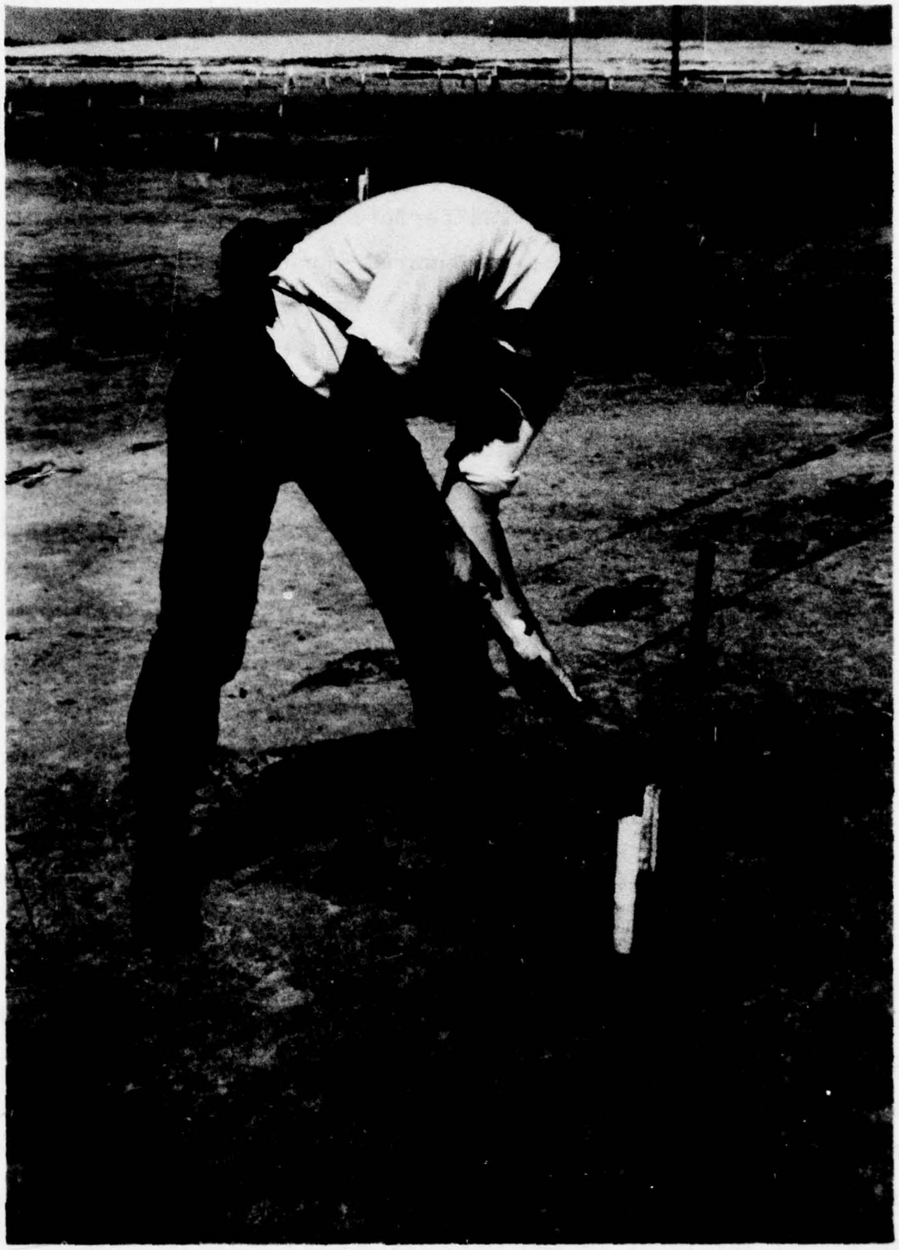


Figure 13. Sampling interstitial water from a soil well buried 25 cm.

the analysis of variance. Statistically significant differences among means were assessed at the 0.05 probability level according to Duncan's Multiple Range test.

Results and Discussion

46. Analysis of variance was performed by years for each of the chemical and physical parameters measured (Appendix B). Comparisons were first tested among each species. In 1976 no significant differences were noted for any of the parameters measured. *Spartina alterniflora* plots had the greatest means for all nitrogen fractions except ammonia which had a larger mean concentration in *Spartina patens* plots. *Spartina patens* areas also contained the highest concentration of total dissolved phosphorus and orthophosphate. One statistically significant mean difference in 1977 was noted for particulate nitrogen, with *Distichlis spicata* plots being significantly greater in concentration than *Spartina patens* plots. The remaining parameters showed no significance among species. These findings substantiated early trends suggesting the size of each individual planted area was not large enough to substantially influence the underlying interstitial water.

47. Tests for nutrient differences resulting from intertidal zone and fertilizer treatments were performed. For 1976 the upper third of the intertidal zone had a significantly higher nitrate-nitrite concentration that did the lower third of the intertidal zone. The remaining physical and chemical parameters showed no significant difference among intertidal zones. The high level of inorganic fertilizer (244 g/m^2) had a significantly greater phosphorus (all forms measured) concentration than any other fertilizer treatment. If the higher levels of phosphorus were a result of artificial fertilization,it would indicate that the fertilizer treatment applied to the sprigged plots had remained in the plots for nearly two years. During 1977, the high concentration of phosphorus in the high inorganic fertilizer treatment disappeared leaving no fertilizer

treatment significantly different. Total phosphorus was significantly greater in the lower intertidal zone and ammonia levels were highest in the lower zone. Other trends indicated a decreasing gradient of pH and redox potential from the upper intertidal zone to the lower intertidal zone. A similar gradient existed for orthophosphate and dissolved phosphorus. Graphs and means for interstitial water nutrients can be found in Appendix B and Figures 14 and 15.

48. Concurrent monitoring of interstitial water runoff, adjacent marsh interstitial water and water column were compared to the interstitial water of the experimental plots. The first year of monitoring (1976) found the adjacent marsh interstitial water to have significantly higher concentrations of ammonia and dissolved phosphorus than either the experimental areas or the runoff. Natural *Spartina alterniflora* marshes usually contain substantial concentrations of both ammonia and dissolved phosphorus. Particulate phosphorus, total phosphorus, total nitrogen, and dissolved nitrogen were all significantly greater in the water column than any of the interstitial water samples. The redox potential was significantly lower in the adjacent marsh interstitial water than in the experimental. The significant differences among means during 1976 documented the substantial interstitial water chemistry differences existing between experimental and natural areas.

49. Dissolved phosphorus of the adjacent marsh interstitial water was significantly greater in concentration than any of the experimental areas. This was the only significant difference resulting from the 1977 sampling. The similarity of nutrient means between established and experimental marsh interstitial water documented the rapid transition of experimental areas to resemblance of natural areas.

50. Investigation of nutrient composition changes in the interstitial water with time was initiated at 0700 hrs. 26 February 1976 (high tide approximately 0635 hrs. EST, 2.19 m). Each plot was sampled an average of 5 times during the course of the ebb tide. Analysis of individual plot nutrient fluctuations revealed minor changes with time and are depicted in Appendix B. Analysis of interstitial water nutrient levels in each intertidal zone with time

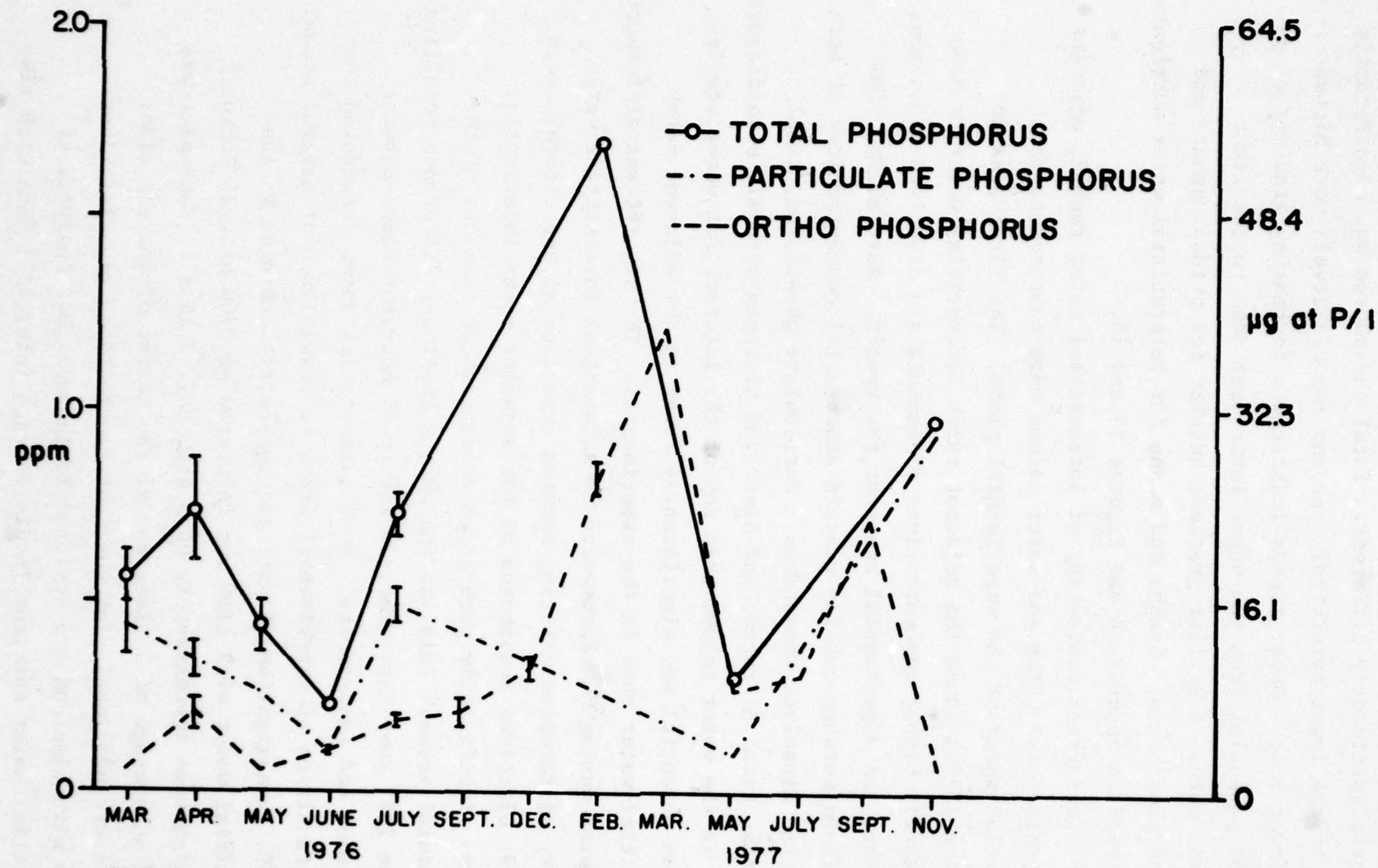


Figure 14. Interstitial water phosphorus at the Buttermilk Sound site for each sampling date.

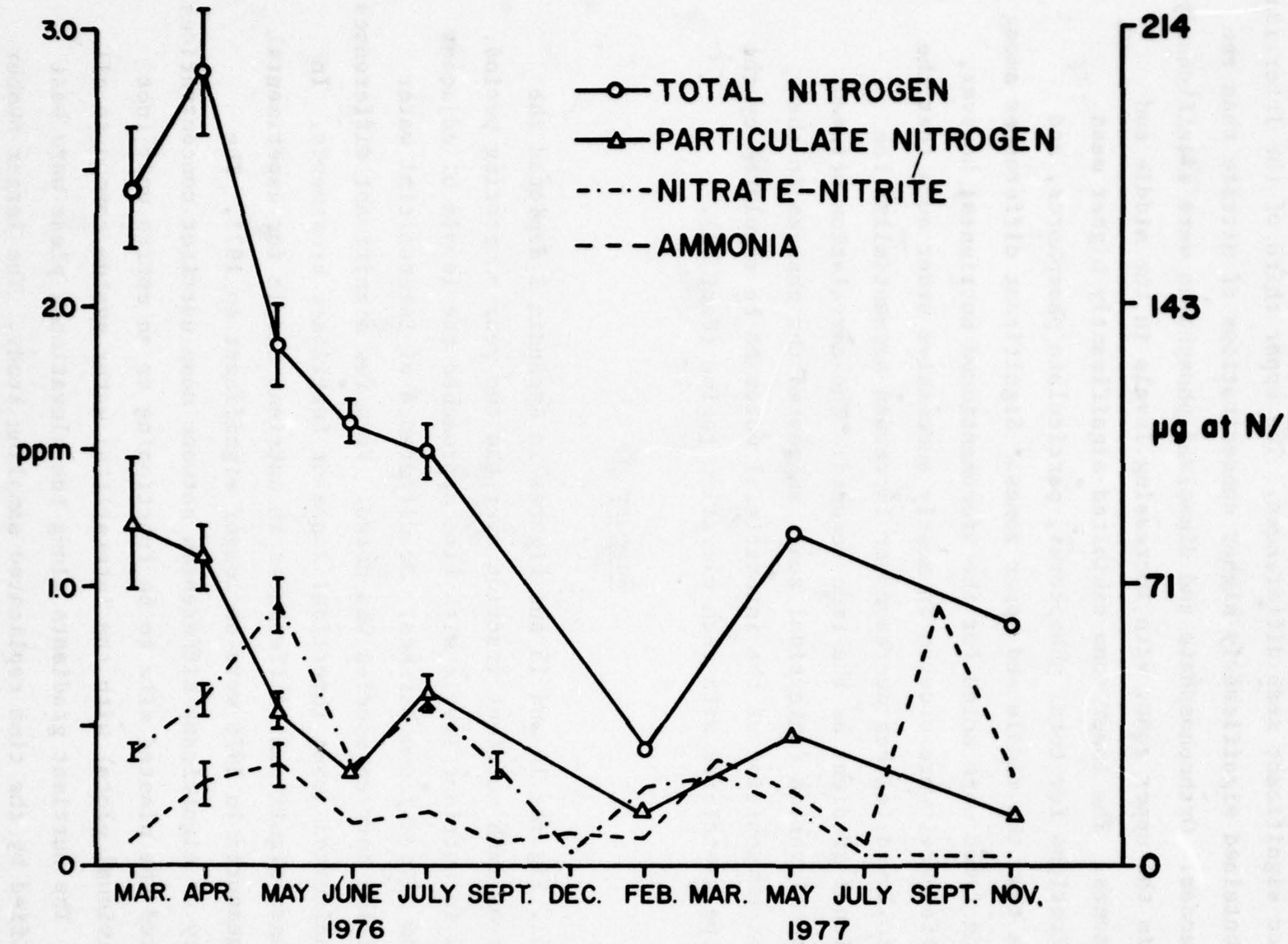


Figure 15. Interstitial water nitrogen at the Buttermilk Sound site for each sampling date.

revealed significant mean differences. The upper third of the intertidal zone contained significantly higher concentrations of nitrate than the other zones. Orthophosphate and dissolved phosphorus were significantly lower in the upper zone, with increasing levels in the middle and lower zones. The lower zone exhibited significantly higher mean concentrations for total phosphorus, particulate phosphorus, and ammonia than the middle and upper zones. Significant differences among sampling times were noted for the aforementioned nutrients; however, the differences were ordered in nearly successive order such that the means followed (either decreased or increased sequentially) the elevational gradient as the tide receded. The correlation between time and elevation (intertidal zone) suggested the changes in the nutrient composition of the interstitial water to be regulated by the soil type associated with each elevation regime (Part VI).

Summary

51. Figures 14 and 15 and figures in Appendix B depicted the changes of each nutrient fraction over the two year monitoring period. Changes in nutrient levels with time approached the levels of adjacent *Spartina alterniflora* marshes. No difference of interstitial water composition between species was noted. Very few significant differences were manifested among intertidal zones or fertilizer treatments. In most cases significant differences in nutrient levels for experimental plots measured in 1976 were no longer significant in 1977. The scarcity of significant differences between mean nutrient concentrations suggested the planted site to be functioning as an entire unit (not by individual plots) with the interstitial water system common to all areas. The nutrient gradients along the elevational plane were best exemplified by the time replicated sampling study. The larger number of replicates from each intertidal zone better described significant differences. The lack of significant nutrient change with time within individual plots and the orderly gradation and significance of time

intervals on the ebb tide suggested differences noted for the interstitial water to be a function of elevation.

PART VI: SOIL CHEMISTRY

Introduction

52. The Buttermilk Sound site was initially composed of a coarse grained sand substrate (see part II). Particle sizes greater than 500 μ comprised 49.8% by weight of the substrate composition. Chemical and physical measurements of the substrate prior to grading can be found in part II. Nutrient levels, organic matter and cation exchange capacity were much lower than levels documented for natural Georgia salt marshes (Maye 1972, Reimold et al. 1978). The marsh substrate is the medium for transfer of necessary plant nutrients and for microbial activity associated with nutrient cycling, and therefore will be a primary factor in the success or failure of a marsh development project.

Methods

53. Soil samples were collected semi-annually using a 4.4 cm (I.D.) section of PVC irrigation pipe as a coring device. The PVC pipe was pushed into the substrate 15 cm, a rubber stopper placed over the top opening and the pipe and core sample removed. The soil was extracted from the pipe onto a sheet of aluminum foil. This procedure was repeated in the same hole if a deeper core was necessary. The core sample was wrapped, sealed and transported on ice to the laboratory. Cores were sectioned into 15 cm segments, (the surface segment representing the active rhizosphere for most species), the substrate homogenized and composited, if necessary, before subsamples for nutrient analysis were taken. All mineral analysis were conducted by the University of Georgia Soil Testing Laboratory.

54. Analyses of potassium, calcium and magnesium were according to Issac and Jones (1971) for determination on an Auto Analyzer System. Other trace mineral methodologies were; boron, Wolf (1971); sulphur, Jones and Issac (1972); extractable zinc, manganese and iron, Nelson et al (1953), Perkins, (1970); copper, cobalt and arsenic, Issac and Kerber,

(1971). Organic matter determinations were performed according to Jackson, (1958), pH determinations were performed according to Peech, (1965), and Eh determination according to Pearsall and Mortimer (1939). Extractable phosphorus was determined using an oxalate extraction procedure (Saunders 1965) with the following modification: shake sediment with oxalate solution (0.1M oxalic acid + 0.2M ammonium oxalate pH 3.25) in a solid to extractant ratio of 1:20 (oven dry basis) for two hours and centrifuge. Filter the supernatant solution through 0.45 micron filter paper and analyze (Khalid and Patrick, personal comm.). Analyses of extractable and total phosphorus were performed according to Technicon (#94-70W, 1973) and Technicon (#376-75W, 1975) respectively. Nitrate and nitrite (Armstong et al, 1967) ammonia (FWPCA, 1969), total dissolved and total nitrogen (Van Slyke and Hiller, 1933), were analyzed using an Auto Analyzer II. The cation exchange capacity (CEC) was determined using a slightly modified version of Toth and Ott (1970). Isopropyl alcohol (99%) was substituted for ethyl alcohol in the washing step for the reasons outlined in Chapman (1965). Determination of the index ion, ammonia, was accomplished as previously described using the Auto Analyzer system.

Results and Discussion

55. A complete analysis of physical and chemical properties of the substrate prior to the site construction can be found in Part II of this report. The substrate was homogenous to a depth of 60 cm with little variation in color between cores. Mineral content of the cores was low and showed small changes with depth. Low levels of organic matter content, CEC, nitrate-nitrite and orthophosphate were all characteristic of this alluvial sediment.

56. Tables 10 and 11 depict the mineral and physical characteristics of soils collected by species in December 1975. Little change had occurred in the mineral concentration of the substrate since the initiation of planting with the exception of significant increases in potassium and magnesium (Tables 3 and 4 Part II) Some silt and organic particles had begun to be deposited on the surface suggesting increases

TABLE 10.

SOIL SAMPLES COLLECTED DECEMBER 18, 1975 AT BUTTERMILK SOUND HABITAT DEVELOPMENT SITE

ZONE	SPECIES	DEPTH cm	Fe ppm	Cu ppm	Zn ppm	K ppm	Ca ppm	Mg ppm	Mn ppm	B ppm	S %	As ppm	Co ppm
3	*Borrichia frutescens*	0-10	37.4	0.05	1.60	20.0	68.0	42.0	3.40	0.20	0.002	0.20	1.25
3	*Borrichia frutescens*	10-38	37.8	0.00	1.15	20.5	58.0	44.0	1.30	0.30	0.002	0.22	1.25
3	*Distichlis spicata*	0-10	44.1	0.00	1.30	23.0	77.0	43.0	3.85	0.25	0.002	0.18	1.25
3	*Distichlis spicata*	10-41	18.9	0.00	0.80	17.5	45.0	22.0	1.65	0.10	0.002	0.13	1.25
3	*Iva frutescens*	0-10	58.5	0.00	1.55	26.0	96.0	74.0	6.95	0.30	0.008	0.26	1.25
3	*Iva frutescens*	10-38	22.3	0.00	3.00	18.5	39.0	20.0	0.15	0.10	0.002	0.11	1.25
3	*Juncus roemerianus*	0-10	48.0	0.00	1.20	20.0	68.0	40.0	2.30	0.10	0.008	0.25	1.25
3	*Juncus roemerianus*	10-38	48.1	0.00	11.50	21.0	68.0	40.0	2.40	0.10	0.008	0.25	1.25
3	*Spartina alterniflora*	0-10	34.0	0.00	3.60	16.0	56.0	36.0	2.35	0.35	0.002	0.19	1.25
3	*Spartina alterniflora*	10-42	49.5	0.00	1.25	22.5	77.0	49.0	2.75	0.35	0.002	0.23	1.25
3	*Spartina cynosuroides*	0-10	50.3	0.00	1.35	20.5	77.0	45.0	3.10	0.20	0.008	0.17	1.25
3	*Spartina cynosuroides*	10-43	28.8	0.00	1.00	17.5	48.0	24.0	0.25	0.05	0.002	0.27	1.25
3	*Spartina patens*	0-10	43.6	0.00	0.90	18.0	71.0	39.0	1.40	0.15	0.002	0.15	1.25
3	*Spartina patens*	10-25	27.9	0.00	0.35	16.0	43.0	24.0	0.00	0.20	0.002	0.07	1.25
3	*Spartina patens*	25-40	38.5	0.00	1.40	22.0	95.0	51.0	0.00	0.10	0.008	0.25	1.25
2	*Spartina alterniflora*	0-10	36.1	0.00	1.40	29.5	61.0	36.0	2.65	0.30	0.002	0.22	1.25
2	*Spartina alterniflora*	10-42	21.1	0.00	0.85	22.0	50.0	36.0	2.45	0.65	0.008	0.11	1.25
2	control	0-10	23.6	0.00	1.35	19.0	72.0	33.0	1.70	0.10	0.002	0.15	1.25
2	control	10-35	16.0	0.00	0.85	16.0	51.0	30.0	2.40	0.45	0.002	0.13	1.25
1	*Spartina alterniflora*	0-15	45.2	0.00	1.35	22.5	73.0	36.0	1.65	0.10	0.002	0.27	1.25
1	control	0-11	43.8	0.00	1.15	24.0	65.0	32.0	1.95	0.10	0.006	0.21	1.25

Zone: 3 = Upper third of intertidal zone, 2 = Middle third of intertidal zone, 1 = Lower third of intertidal zone; Depth = Depth of cores in centimetres; Zn ppm = Zinc in parts per million; % Sulfur = Percent Sulfur in soil; Fe ppm = Iron in parts per million; Cu ppm = Copper in parts per million; B ppm = Boron in parts per million; K ppm = Potassium in parts per million; Ca ppm = Calcium in parts per million; Mg ppm = Magnesium in parts per million; Mn ppm = Manganese in parts per million; As ppm = Arsenic in parts per million; Co ppm = Cobalt in parts per million

TABLE 11.

SOIL SAMPLES COLLECTED DECEMBER 18, 1975 AT BUTTERMILK SOUND HABITAT DEVELOPMENT SITE

ZONE	SPECIES	DEPTH cm	pH^w	Eh	CEC meg/100g	%OM	NO_3, NO_2 ppm
3	*Borrichia frutescens*	0-10	7.2	460	1.54	0.20	14.0
3	*Borrichia frutescens*	10-38	7.0	470	1.11	0.13	14.0
3	*Distichlis spicata*	0-10	6.8	480	1.60	0.13	7.0
3	*Distichlis spicata*	10-41	6.7	490	0.85	0.20	4.0
3	*Iva frutescens*	0-10	6.9	480	1.56	0.20	21.0
3	*Iva frutescens*	10-38	6.8	480	0.41	0.20	7.0
3	*Juncus roemerianus*	0-10	7.1	470	1.53	0.20	14.0
3	*Juncus roemerianus*	10-38	6.8	460	1.53	0.20	7.0
3	*Spartina alterniflora*	0-10	7.0	470	1.02	0.20	7.0
3	*Spartina alterniflora*	10-42	7.2	470	1.25	0.13	14.0
3	*Spartina cynosuroides*	0-10	7.0	490	1.61	0.27	11.0
3	*Spartina cynosuroides*	10-43	6.7	480	1.28	0.13	3.5
3	*Spartina patens*	0-10	6.9	470	1.28	0.13	7.0
3	*Spartina patens*	10-25	6.7	460	0.86	0.07	3.5
3	*Spartina patens*	25-40	6.9	460	1.75	0.13	3.5
3	control	0-10	7.6	430	19.27	0.13	0.0
3	control	10-42	7.3	440	29.08	3.40	IA
2	*Spartina alterniflora*	0-10	6.8	490	1.08	0.07	3.5
2	*Spartina alterniflora*	15-36	6.8	460	1.34	0.13	3.5
2	control	0-10	6.8	480	0.68	0.07	7.0
2	control	10-35	6.8	480	1.34	0.34	3.5
1	*Spartina alterniflora*	0-15	6.8	490	1.08	0.07	3.5
1	*Spartina alterniflora*	15-36	6.8	460	1.34	0.13	3.5
1	control	0-10	6.8	480	0.68	0.07	7.0
1	control	10-35	6.8	480	1.34	0.34	3.5

Zone: 3 = Upper third of intertidal zone, 2 = Middle third of intertidal zone, 1 = Lower third of intertidal zone; depth = depth of cores in centimetres; pH^w = pH of 1:1 water to soil mixture; Eh = Redox potential in millivolts; CEC meg/100g = Cation Exchange Capacity in milliequivalents per 100g dry weight of soil; %OM = Percent organic matter by weight; NO_3, NO_2 ppm = Nitrate and nitrite in parts per million; IA = Insufficient amount of sample for testing.

in organic matter and CEC (Table 11). The increase in the nitrate-nitrite concentration may indicate residual fertilizer nitrate or the accumulation of nitrate from the microbial community in the existing areobic conditions. Surface and deeper substrate samples were similar in physical and mineral characteristics.

57. Nitrogen and phosphorus analyses of the substrate for 1976 are found in tables 12 and 13. Samples collected in June 1976 were extracted from each plot containing vegetation. Initial partitioning of data by species and fertilizer treatment failed to produce significant mean differences, therefore, means are presented by zone and sample depth. Table 12 depicts the increases in ammonia, orthophosphate, total kjeldahl nitrogen, and total phosphorus in the substrate from the time of first transplantation. An accelerated deposition of silt onto the upper and middle zones of the site had fostered an increased microbial community (see part VII of this report) and the rapid increase of the nutrients. The upper third of the intertidal zone possessed the highest mean concentration for each nutrient fraction. Surface substrate samples in the upper and middle zones had begun to resemble nutrient levels found in marsh soils. The availible fractions of nitrogen and phosphorus determined during November 1976 illustrated decreases in concentration of all nutrients measured. The decreases were not consistent with the finding of Delaune et al. (1976) where nutrient levels increased in late fall for a Louisiana Bay.

58. Mineral and physical characterization of soil samples was determined in July 1977 (Table 14 and 15). The continual accumulation of silt on the site was reflected in significant increases in CEC and organic matter content since November 1975 (Table 14). The mean CEC was greatest for the upper third of the intertidal zone and lowest for the lower third of the intertidal zone. The differences between surface and subsurface soil samples were no longer significantly different. Changes from November 1975, manifested by the mineral determinations were an increase of iron in surface (rhizosphere) samples, a similar increase in calcium

TABLE 12.

CHEMICAL CONTENT OF CORES TAKEN AT BUTTERMILK SOUND HABITAT

DEVELOPMENT SITE JUNE 1976

ZONE	CORE DEPTH (cm)	NH_3 µg/g	NO_3, NO_2 µg/g	PO_4 µg/g	TKN mg/g	TP mg/g
3	0-10	47.14	0.89	7.56	0.32	0.14
3	10-30	14.62	0.51	4.63	0.08	0.06
2	0-10	44.55	0.83	7.55	0.24	0.11
2	10-30	16.70	0.56	5.01	0.17	0.06
1	0-10	8.65	0.75	3.60	0.05	0.04
1	10-30	9.85	0.47	5.98	0.05	0.07

Zone: 3= Upper third of the intertidal zone, 2= Middle third of the intertidal zone, 1= Lower third of the intertidal zone; Core depth= depth of core in centimetres; NH_3= ammonia in micrograms per gram ; NO_3, NO_2= Nitrate-nitrite in micrograms per gram; PO_4= Orthophosphate in micrograms per gram ; TKN= Total Kjeldahl Nitrogen in milligrams per gram ; TP= Total Phosphorus in milligrams per gram

TABLE 13.

CHEMICAL CONTENT OF CORES TAKEN AT BUTTERMILK SOUND HABITAT DEVELOPMENT SITE NOVEMBER 1976

ZONE	CORE DEPTH (cm)	NH_3 µg/g	NO_3, NO_2 µg/g	PO_4 µg/g
3	0-10	26.50	0.15	5.20
3	10-30	3.00	0.10	3.70
control	0-10	4.60	0.00	2.70
control	10-30	32.10	0.10	0.71
2	0-10	15.30	0.13	6.31
2	10-30	4.03	0.10	2.91
1	0-10	12.20	0.10	11.30
1	10-30	6.10	0.00	2.70
control	0-10	192.00	0.60	14.50
control	10-30	2.70	0.00	2.80

Zone= 3= Upper third of the intertidal zone, 2= Middle third of the intertidal zone, 1= Lower third of the intertidal zone; Core depth= depth of core in centimetres; NH_3= ammonia in micrograms per gram; NO_3, NO_2= nitrate-nitrite in micrograms per gram; PO_4= orthophosphate in micrograms per gram; control= core taken from adjacent *Spartina alterniflora* marsh

TABLE 14.

CHEMICAL ANALYSIS OF CORES TAKEN AT BUTTERMILK SOUND HABITAT DEVELOPMENT SITE JULY 11, 1977

ZONE	REP	DEPTH cm	pH^w	% H_2O	CEC mg/100g	% OM	NO_3 NO_2 ppm	HUE	VALUE/CHROMA
3	1	0-20	7.0	0.4	36.6	3.3	12.5	10 yr	4/3
3	1	20-35	6.9	0.4	37.9	3.1	10.5	10 yr	4/6
3	2	0-20	7.4	3.6	49.6	13.8	3.5	10 yr	4/6
3	2	20-30	7.7	0.1	43.5	2.7	16.0	10 yr	6/4
3	3	0-20	7.3	4.3	32.8	3.1	10.5	10 yr	4/6
3	3	22-37	7.1	2.4	34.6	7.4	9.0	10 yr	4/6
2	1	0-15	6.9	4.3	72.8	3.3	12.5	10 yr	4/4
2	1	15-30	6.9	9.5	43.5	2.7	9.0	10 yr	4/4
2	2	0-20	6.8	7.1	18.9	3.3	7.0	10 yr	4/3
2	2	20-35	6.6	12.0	26.5	8.5	9.0	10 yr	4/4
2	3	0-20	6.7	0.0	26.0	5.5	9.0	10 yr	4/4
2	3	20-35	6.8	5.6	34.6	2.5	12.5	10 yr	5/3
1	1	0-20	6.7	13.2	22.5	6.0	10.5	10 yr	3/3
1	2	20-30	6.8	12.3	22.5	5.8	2.0	10 yr	3/3

Zone: 3= Upper third of intertidal zone, 2= Middle third of intertidal zone, 1= Lower third of intertidal zone; depth= depth of cores in centimetres; pH^w= pH of 1:1 distilled water to soil mixture; % H_2O= percent water content; CEC meg/100g= Cation Exchange Capacity in milliequivalents per 100g dry weight of soil; % O.M.= percent organic matter by weight; NO_3 NO_2 ppm = Nitrate and nitrite in parts per million; Hue, value, and chroma are based on Munsell color code

TABLE 15.

MINERAL CONTENT OF CORES TAKEN AT BUTTERMILK SOUND HABITAT DEVELOPMENT SITE JULY 11, 1977

ZONE	REP	DEPTH cm	Fe ppm	Cu ppm	P ppm	K ppm	Ca ppm	Mg ppm	Mn ppm	B ppm
3	1	0-20	94.0	0.30	6.0	27.5	108.0	42.0	9.0	0.25
3	1	20-35	36.0	0.20	8.0	20.0	84.0	31.0	3.5	1.05
3	2	0-20	92.0	0.30	7.0	20.0	120.0	39.0	9.5	0.10
3	2	20-35	29.0	0.15	3.0	10.0	36.0	10.0	1.0	1.05
3	3	0-20	68.0	0.30	6.0	20.0	108.0	44.0	7.5	0.40
3	3	22-37	52.0	0.20	5.0	12.5	74.0	30.0	3.5	0.10
2	1	0-15	98.0	0.30	10.0	22.5	156.0	29.0	7.0	0.10
2	1	15-30	60.0	0.15	8.0	10.0	96.0	30.0	1.0	0.05
2	2	0-20	40.0	0.25	6.0	20.0	132.0	43.0	1.0	0.05
2	2	20-30	23.5	0.15	4.0	12.5	84.0	28.0	2.5	0.05
2	3	0-20	60.0	0.40	4.0	15.0	74.0	30.0	5.5	0.05
2	3	20-35	96.0	0.10	4.0	10.0	72.0	23.0	8.5	0.05
1	2	0-20	84.0	0.30	7.0	12.5	108.0	25.0	7.5	0.05
1	2	20-30	44.0	15.0	4.0	15.0	96.0	32.0	5.5	0.10

Zone: 3 = Upper third of intertidal zone, 2 = *Middle* third of intertidal zone, 1 = Lower third of intertidal zone; Rep = replication number; Depth = depth of core in centimetres; Fe ppm = Iron in parts per million; Cu ppm = Copper in parts per million; P ppm = Phosphorus in parts per million; K ppm = Potassium in parts per million; Ca ppm = Calcium in parts per million; Mg ppm = Magnesium in parts per million; Mn ppm = Manganese in parts per million

and a slight overall decrease in magnesium (Table 15). Patrick (1964) noted a large release of ferrous iron when the redox potential dropped below +200 mv which may account for the iron increases. Several measurements of intetestitial water redox potential fell below +200 mv during this period (See Part V).

59. Tables 16 and 17 described soil characteristics for the site in November 1977. Physical changes included a large reduction in CEC, reduction of redox potential in middle and lower zones, attentuated nitrate-nitrite concentration as compared to the July 1977 sampling, (but similar to the November 1976 sampling) and a decrease in total kjeldahl nitrogen, total phosphorus and ammonia. The experimental marsh appeared to be accumulating phosphate (as seen by the high concentrations) as the new marsh accumulated silt and detritus particles. Gradation of nutrient levels by intertidal zone was not as pronounced for November 1977, however, mean differences were evident between surface and below ground soil samples. Table 17 depicts the mineral content of sample cores. Iron continued to increase with little change in the remaining elements. The minerals reflected a vertical gradient, within the substrate. Along the elevation gradient, the middle zone was highest in mineral concentration.

Summary

60. The sandy substrate utilized to construct the habitat development site initially possessed extremely low concentrations of all nutrients and minerals. After transplantation the combination of a gradually sloping plane and of sufficient vegetation to slow tidal velocities helped to accumulate a silt layer. This silt layer (and associated microbial communities) altered the physical character of the soil and fostered the increase of nutrients. The addition of silt to the substrate surface was met with daily tidal seepage which transported the silt particles further into the substrate. As this process continued the previous differences between surface and subsurface samples were equalized. Increases in orthophosphate, ammonia and iron all indicated the intiation of microbial activity and reduction of redox potential (anaerobic conditions).

Table 16.

Chemical Analysis of Cores Taken at Buttermilk Sound

Habitat Development Site, November 1977

Zone	Rep	Depth (cm)	pH^w	Eh	Percent H_2O	CEC meg/100g	Total N mg/g	NO_3, NO_2 ppm	NH_3 ppm	Total P mg/g	PO_4 ppm
3	1	0-15	7.0	450	7	2.88	1.00	6.60	8.00	17.60	17.10
3	1	15-32	7.1	460	10	5.40	81.60	0.20	3.10	15.90	192.80
3	2	0-15	7.1	430	11	1.92	1.20	0.50	8.40	20.50	20.40
3	2	15-30	7.3	360	8	7.76	0.80	0.25	3.20	16.90	42.70
3	3	0-15	7.2	430	10	7.29	97.40	0.50	1.12	39.70	58.80
3	3	15-30	7.2	440	5	3.70	12.30	0.20	3.40	19.10	13.00
2	1	0-15	7.2	210	17	5.75	21.10	0.35	11.60	29.90	36.40
2	1	15-31	7.1	350	11	11.01	12.50	3.00	4.75	14.90	50.30
2	2	0-15	6.9	190	18	4.90	25.90	0.45	9.95	33.50	17.30
2	2	15-31	7.2	280	10	2.68	0.07	2.45	2.45	18.50	17.50
2	3	0-15	7.1	160	15	2.92	77.40	3.60	5.90	41.60	30.70
2	3	15-30	7.2	300	7	6.88	0.30	3.55	2.45	15.30	19.20
1	2	0-15	7.2	160	7	8.49	15.50	0.25	3.50	10.40	24.70
1	2	15-35	7.3	210	15	5.96	132.80	0.50	3.40	20.90	115.40

Zone: 3 = Upper third of intertidal zone, 2 = Middle third of intertidal zone, 1 = Lower third of intertidal; Rep = Replicate number; Depth = Depth of cores in centimetres; Percent H_2O = Percent water content; NO_3, NO_2 ppm = Nitrate and Nitrite in parts per million; pH^w = pH of 1:1 distilled water to soil mixture; CEC meg/100g = Cation Exchange Capacity in milliequivalents per 100g dry weight of soil; Total N mg/g = Total Nitrogen in milligrams per gram of soil material; NH_3 ppm = Ammonia in parts per million; Total P mg/g = Total Phosphorus in milligrams per gram of soil material; PO_4 ppm = Phosphates in parts per million; Eh = Redox potential in millivolts.

TABLE 17.

MINERAL CONTENT OF CORES TAKEN AT BUTTERMILK SOUND HABITAT DEVELOPMENT SITE NOVEMBER 1977

ZONE	REP	DEPTH (cm)	Fe ppm	Cu ppm	P ppm	K ppm	Ca ppm	Mg ppm	Mn ppm	B ppm	S ppm	Co ppm	As ppm
3	1	0–15	97.5	5.50	6.0	33.5	92.0	74.0	11.0	0.870	25.0	<5	1.06
3	1	15–32	57.5	0.20	6.0	24.0	71.0	58.5	4.0	0.10	16.0	<5	0.46
3	2	0–15	62.5	0.25	4.0	24.5	66.0	61.5	5.0	0.075	18.5	<5	0.44
3	2	15–35	50.0	0.10	4.0	21.0	43.0	50.0	2.5	0.115	15.0	<5	0.52
3	3	0–15	95.0	0.30	6.0	37.5	82.5	74.5	11.5	0.23	14.5	<5	0.99
3	3	15–35	52.5	0.15	4.0	18.0	54.5	44.0	3.5	0.12	9.5	<5	0.64
2	1	0–15	125.0	0.25	6.0	34.5	101.5	90.0	21.5	0.22	28.5	<5	0.78
2	1	15–31	16.5	0.15	4.0	13.5	41.0	38.5	2.0	0.015	15.0	<5	0.30
2	2	0–15	145.0	0.6	10.0	46.5	154.5	133.5	36.5	0.265	71.5	<5	0.94
2	2	15–31	35.0	0.10	4.0	14.0	53.0	43.0	7.5	0.085	23.0	<5	0.33
2	3	0–15	129.0	0.40	12.0	49.0	131.5	78.5	58.5	0.22	33.0	<5	0.79
2	3	15–23	35.0	0.25	4.0	25.5	58.5	42.5	29.0	0.035	17.0	<5	0.62
1	2	0–15	33.5	0.20	4.0	19.5	50.5	43.0	9.0	0.045	15.5	<5	0.53
1	2	15–31	42.5	0.20	4.0	22.0	54.5	55.0	10.5	0.06	8.5	<5	0.50

Fe ppm= Iron in parts per million; Cu ppm= Copper in parts per million; P ppm= Phosphorous in parts per million; K ppm= Potassium in parts per million; Ca ppm= Calcium in parts per million; Mg ppm= Magnesium in parts per million; Mn ppm= Manganese in parts per million; B ppm= Boron in parts per million; S ppm= Sulfur in parts per million; Co ppm= Cobalt in parts per million; As ppm= Arsenic in parts per million; Zone= 3= Upper third of intertidal zone, 2= Middle third of intertidal zone, 1= Lower third of intertidal zone; depth= depth of cores in centimetres.

61. The high concentration of nitrate and the generally high redox potential values indicated the soil to be aerobic; however, several *Spartina alterniflora* areas in the middle and lower zones had reached redox potential as low as +160 mv. Under these conditions, the oxidized rhizosphere (oxygen is translocated to *Spartina* roots and released) could facilitate oxidation of ammonia to nitrate which in turn diffuses to nearby anaerobic areas and is dentrified (Delaune et al. 1976). Therefore the low nitrate concentration and redox potential suggested these marsh conditions did exist.

62. The soil genesis on the site had progressed to a point where the soil could adequately support the vegetation as seen by culm density and biomass measurements. The levels of many of the nutrients and minerals were still lower than for natural areas (Reimold et al. 1978) thus the site will require more time to accumulate these elements.

PART VII: MICROBIAL ANALYSIS

Introduction

63. Odum (1971) described ecological succession as an orderly process from an unstable low biomass environment eventually to a stable high biomass ecosystem. Primary producers, by supplying the necessary organic carbon, support microheterotrophs (bacteria, yeast, and protozoans), who in turn support the meiofauna and macrofauna populations. As the system matures, the food web eventually becomes more complex and the system switches from a grazing food web to a detritial food web, typified by the marshes in Georgia. Ecosystem analysis emphasizes the flow of energy from the primary producers to the secondary producers. Therefore, the importance of the algae and bacteria at the base of the food web is vital to community development and stability within the ecosystem. Understanding the development of the microbial community and production rates of various populations in dredged materials will greatly increase our knowledge of coastal ecosystems.

64. Several investigators have reported on the establishment of rooted aquatic plants (Woodhouse et al., 1972, 1974; Seneca et al., 1975; Seneca, 1974) and macro-invertebrate invasion and colonization within dredged material (Garbisch et al., 1975; Cammen, 1976a, b). However, there have been no reports on microbial development and relationship between the microbial biomass and population density to higher plant establishment in dredged materials. Therefore, the objectives of the research reported here were to monitor microbial development in relation to salt marsh plant establishment in dredged material at Buttermilk Sound, Georgia.

65. The dredged material site was graded on the eastern side of the island from mean low water (MLW) to mean high water (MHW). Below MLW sand waves were quite evident indicating high energy water movement. The MLW zone was very unstable and movement of sand in the northern section of the site formed a sandy shoal adjacent to the AIWW. The

site was divided into three replicate blocks covering the three tidal zones (upper, middle, and lower thirds). Within each block and tidal zone the blocks were further subdivided into 80 1.5 m x 3m plots which were planted with marsh plant sprigs or seeds and fertilized with various levels of organic or inorganic fertilizers. Each plot was separated by a 0.7 m border for access to the plots (See Part III).

66. The microbiology was performed on two sprigged areas, either *Spartina alterniflora* (SA) or *Spartina patens* (SP), and a non-planted (NP) area. Experimental plots utilized received no fertilizer treatment and were designated as sprigged areas. *Spartina alterniflora* from the lower and middle zones and *Spartina patens* from the upper zone were selected on the basis of high survival rates in their respective zones. Figure 16 shows the random location of SA, SP, and NP plots within each block.

Materials and Methods

67. Polyvinyl chloride tubes (ID 4.4 cm) were used to collect 3 sediment cores from each plot. The tubes were returned to laboratory in a cooler with crushed ice at the bottom. The sediment was pushed from the tubes and sections (surface to 2 cm, 5-7 cm and 10-12 cm) were separated from the core. Samples (1 cc) were removed from each section for ATP extraction, bacterial counts, yeast counts and algal enrichments.

Microbial biomass

68. Adenosine triphosphate (ATP) standing stocks in planted and non-planted plots over depth and time were measured (Bancroft et al. 1975). One cc of sediment was extracted in 16 ml of boiling 0.1 M NaH_2CO_3 buffer (pH 7.8) and centrifuged, and the supernatant was frozen until analysis. ATP was analyzed by the luciferin-luciferase reaction with a JRB Photometer.

Bacterial density

69. Bacterial density was estimated by serially diluting 1 cc of sample

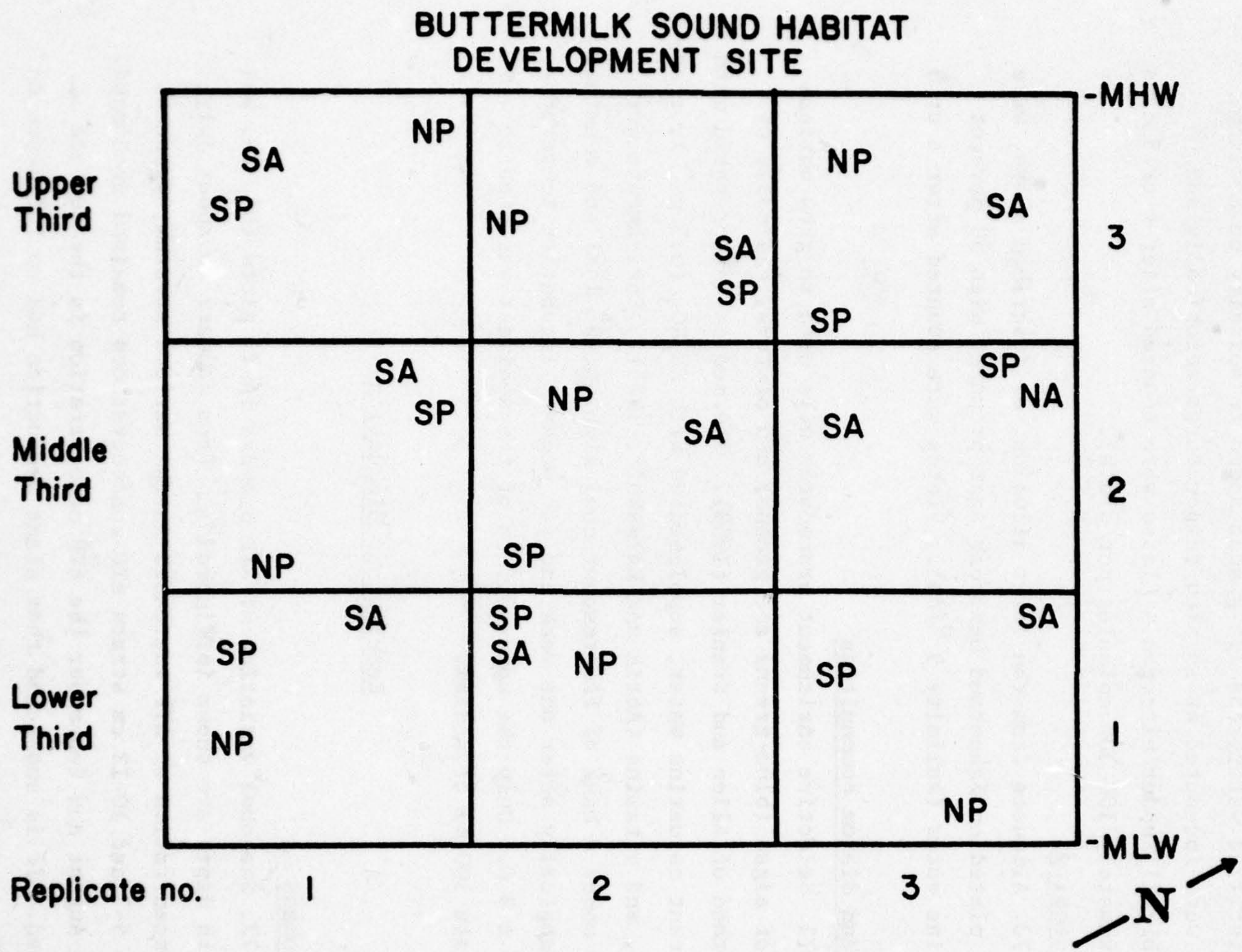


Figure 16. Diagramic location of the *Spartina alterniflora* (SA), *Spartina patens* (SP) and non-planted (NP) plots within each block and tidal zone.

in 9 ml sterile estuarine water ($\sim$ 10 ^{o}/oo diluted 1:1 with distilled water). Aliquots from various dilutions were spread plated on 3 or 4 agar plates prepared with Difco 2216 Marine Agar, diluted 50 percent with distilled water, and 7.5 g agar added to solidify on cooling. Plates were incubated at in situ temperatures aerobically and anaerobically under nitrogen. Plates were counted after 4 or 5 days (approximately 100-300 colonies per plate).

Yeast density

70. Aliquots from the lower dilution, as described above, were spread plated on Sabouraud Dextrose Agar prepared with 50 percent estuarine water (salinity 5 ^{o}/oo). Plates were counted after 4 or 5 days.

Algal and diatom communities

71. Selective enrichment procedures were used to grow various types of algae (blue-greens and greens) and diatoms, basically by the method of Allen and Stanier (1968). The medium was prepared with 50 percent estuarine water, supplemented with NH_4NO_3 (0.5 gl^{-1}), trace metals, and vitamins (Antia and Kalmakoff, 1965). Enrichments were placed under a bank of fluorescent cool lights (10^4 lux) and examined microscopically after one week and two weeks. Incubation temperature was 25 ± 3 C. Only the upper 0.5 cm of the sediment was used to inoculate 100 ml of medium.

Results and Discussion

ATP biomass

72. Seasonal variation of ATP biomass in 27 plots (NP, SA, and SP) with depth are shown in Figure 17a. From January to about July, the concentration of ATP increased in the surface stratum; whereas, in the 5-7 and 10-12 cm strata ATP concentrations remained unchanged. During August and September the ATP concentration in the surface declined. It is suspected that plant production had no influence on the ATP concentrations in the dredged sediment, since similar trends were observed for plots without plants (Figures 17a and 17b).

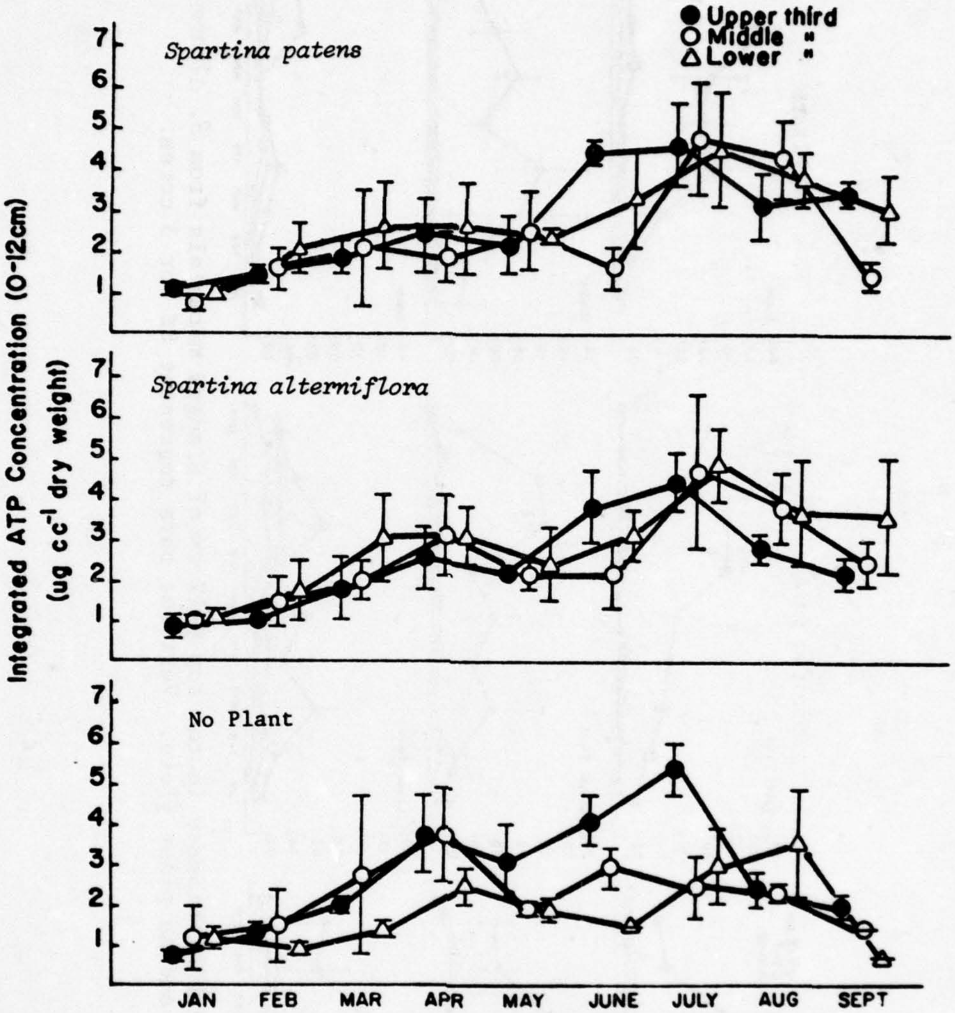


Figure 17a. Microbial biomass (ATP) for each third of the intertidal zone. The ATP values for each block within each tidal zone were pooled and the mean ± SE plotted.

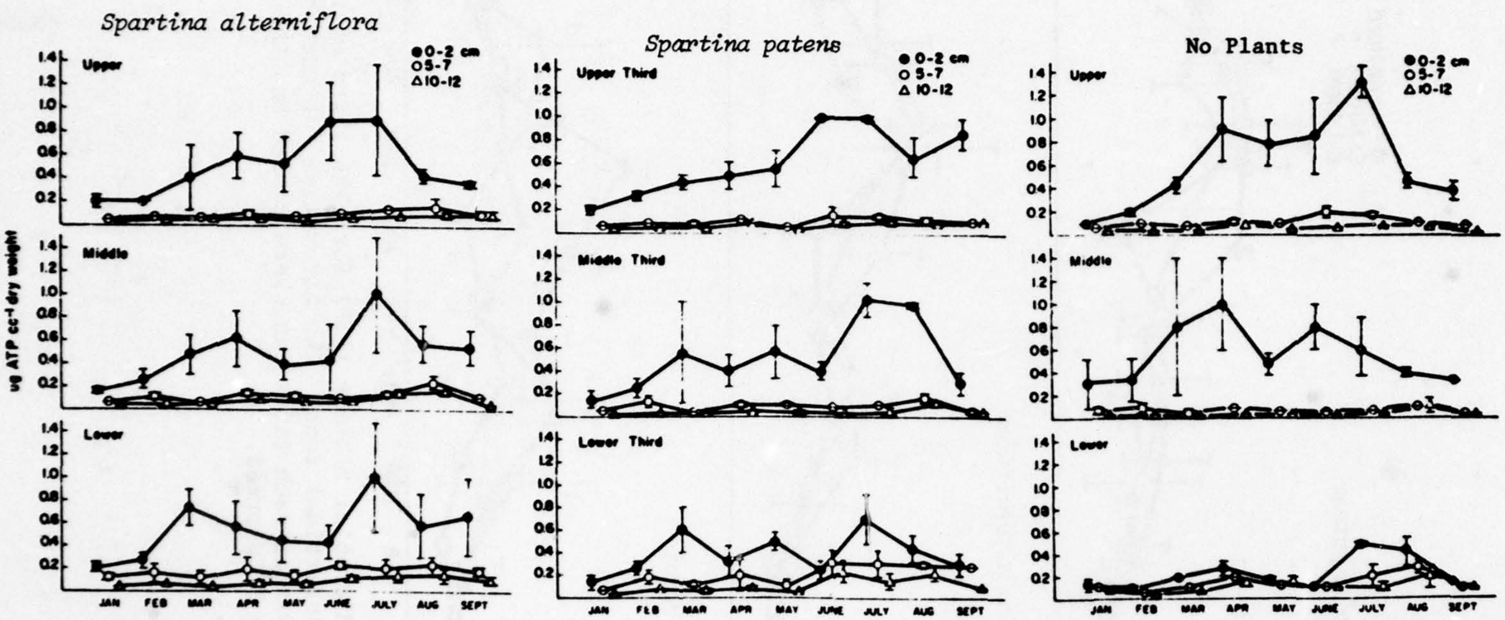


Figure 17b. Total microbial biomass in the top 0-12 cm of dredged materials from *S. alterniflora*, *S. patens* and no plant plots. Vertical bars represent SE for 3 cores.

In addition there was very little difference between ATP concentration and detritus deposition at various elevations at the site (Figure 17b). Detritus (silt and clay of abiogenic origin and particulate organic matter of biogenic origin) deposition was greatest in upper and middle thirds at the site whereas in the lower third detritus deposition was visually much less and sand waves were most prevalent. Water currents thus prevented any build up of macroscopic detritus in this area of the site. Also, salt marsh plant establishment was unsuccessful in the high energy, lower elevation area. Thus, the increase in ATP concentrations appeared to be unrelated to plant production or detritus deposition at the three elevations.

73. A summary of ATP changes with time can be found in Table 18. Increases were noted throughout the experimental period with the upper third of the intertidal zone maintaining the highest levels of ATP biomass. Only slight differences were noted between planted and control areas.

74. For comparison with other coastal systems (Table 19), the ATP biomass (10 g C m^{-2} for top 12 cm) found at Buttermilk Sound was approximately 2 or 3 times lower than ATP biomass reported by Ferguson and Murdock (1975) working in subtidal estuarine sands in the Newport River estuary, North Carolina. Christian et al. (1975), working in the *Spartina* marshes contiguous to Sapelo Island, Georgia, reported microbial ATP biomass 6 times higher than the concentration measured at Buttermilk Sound. This was not surprising since the habitat at Buttermilk Sound was composed of nearly 50 percent medium and coarse sand grains whereas natural marsh was composed primarily of silt and clay. Dale (1974) reported bacterial numbers were highly correlated with grain size which accounted for over 80 percent of the variance in bacterial numbers.

Bacterial density

75. The bacterial populations (aerobes and facultative anaerobes) in dredged materials were also investigated over time in relation to the planted and non-planted plots in only the middle intertidal zone. Figure 18 showed the bacterial populations between January and September

Table 18.

Microbial ATP Analyses, Buttermilk Sound, Georgia

Date	Intertidal Zone	Species	μg ATP × cc^{-1} Mean	Standard Error
September 1975	Upper third	*Spartina alterniflora*	0.238	±0.027
		Spartina patens	1.008	±0.086
		No plant	2.687	±2.457
	Middle Third	*Spartina alterniflora*	0.536	±0.457
		Spartina patens	0.167	±0.069
		No plant	0.387	±0.302
	Lower Third	*Spartina alterniflora*	0.172	±0.076
		Spartina patens	0.121	±0.022
		No plant	0.204	±0.040
November 1975	Upper Third	*Spartina alterniflora*	0.030	±0.242
		Spartina patens	0.113	±0.048
		No plant	0.032	±0.017
	Middle Third	*Spartina alterniflora*	0.038	±0.028
		Spartina patens	0.023	±0.007
		No plant	0.026	±0.017
	Lower Third	*Spartina alterniflora*	0.051	±0.031
		Spartina patens	0.035	±0.017
		No plant	0.007	±0.001
June 1976	Upper Third	*Spartina alterniflora*	0.077	±0.062
		Spartina patens	0.085	±0.061
		No plant	0.076	±0.050
	Middle Third	*Spartina alterniflora*	0.040	±0.024
		Spartina patens	0.029	±0.020
		No plant	0.046	±0.045
	Lower Third	*Spartina alterniflora*	0.052	±0.019
		Spartina patens	0.052	±0.005
		No plant	0.023	±0.001
September 1976	Upper Third	*Spartina alterniflora*	0.189	±0.088
		Spartina patens	0.329	±0.264
		No plant	0.171	±0.109
	Middle Third	*Spartina alterniflora*	0.228	±0.157
		Spartina patens	0.127	±0.089
		No plant	0.124	±0.107
	Lower Third	*Spartina alterniflora*	0.318	±0.178
		Spartina patens	0.224	±0.067
		No plant	0.099	±0.020
June 1977	Upper Third	*Spartina patens*	0.658	±0.137
		No plant	0.558	±0.176
	Middle Third	*Spartina alterniflora*	0.402	±0.171
		No plant	0.940	±0.502
	Lower Third	*Spartina alterniflora*	0.262	±0.169
November 1977	Upper Third	*Spartina patens*	0.518	±0.228
		No plant	0.287	±0.049
	Middle Third	*Spartina alterniflora*	0.450	±0.119
		No plant	0.322	±0.195
	Lower	*Spartina alterniflora*	2.519	±2.917

μg ATP × cc^{-1} = Micrograms of adenosine triphosphate per centimetre of soil material

Table 19. Microbial, bacterial, meiofaunal, and macrofaunal biomass and density in various habitats.

Parameter	Habitat	Depth (cm)	Biomass (g C m^{-2})	Density	Method	Source
Microbial	Salt marsh	0-10	56*	-	ATP	Christian et al. (1975)
Microbial	Estuarine Sand	0-15	14-27*	-	ATP	Ferguson and Murdock (1975)
Bacterial	Intertidal Sediment	0-10	3-13**	10^8-10^{10}/g	Direct count	Dale (1974)
Bacterial	Salt marsh			10^{-5}-10^7	Plate counts	Hood & Colmer (1970)
Meiofaunal	Salt marsh	0-14	2.85***,†	2 x 10^7/m^2	Sieve	Teal and Wieser (1966)
Meiofaunal	Salt marsh		.59-1.0†	1-5 x 10^6/g wet wt.		Day et al., 1973
Macrofaunal (1976a)	Drum Inlet	0-13	.50-7.5†	1-6 x 10^3/m2	Sieve	Cammen (1976)

* assuming C:ATP ratio of 250:1
** assuming 2.2 x 10^{-13} g C/cell
***assuming 25% water (Wieser 1960)
† Carbon 50% of dry weight
†† for polychaetes

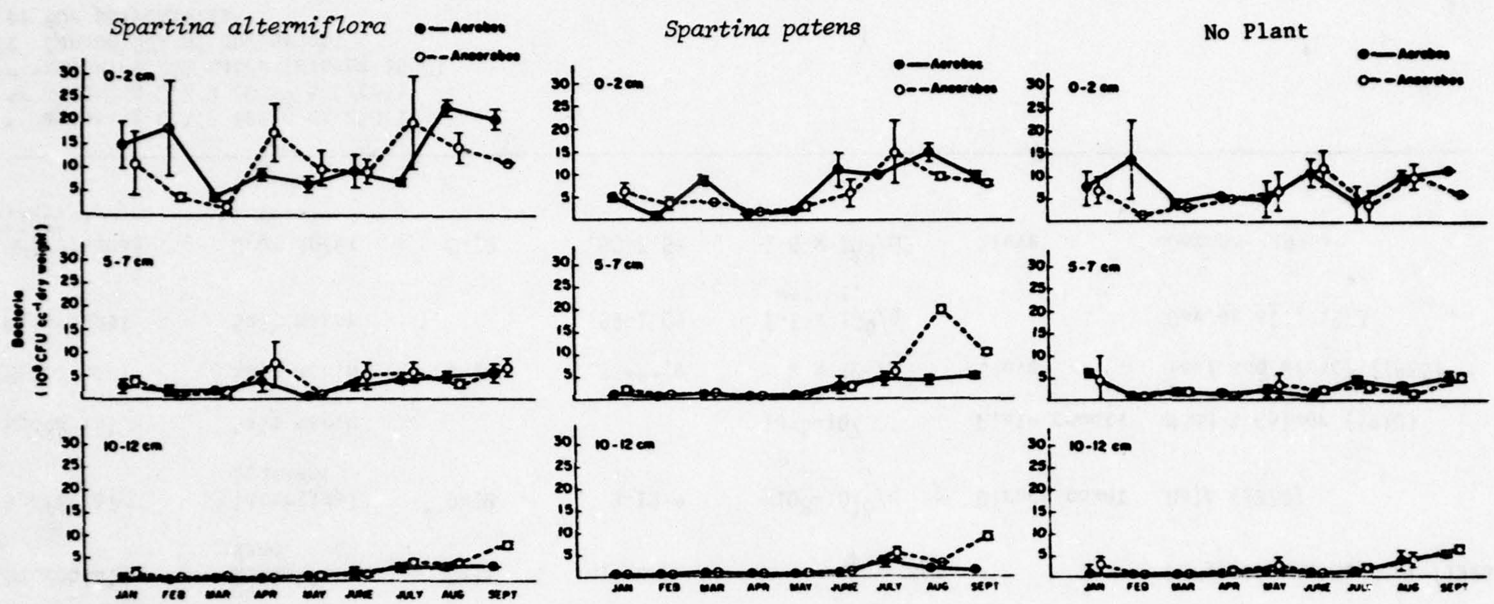


Figure 18. Bacterial biomass (colony forming units, CFU) in *S. alterniflora*, *S. patens*, and no plant plots in the middle tidal zone. Aerobes and anerobic CFU for each block were pooled and the mean ± SE plotted.

for NP, SA, and SP plots at three depths. In the surface stratum, the bacterial populations were generally greater than 5×10^5 colony forming units (CFU) g^{-1} dry weight. The populations were nearly an order of magnitude lower in the substrata than in the surface stratum. Bacterial depth profile compared with the ATP data over depth.

76. Figure 19 showed the relative numbers of platable aerobes and anaerobes in the dredged materials. The density of bacteria was an order of magnitude lower than the platable bacterial cell counts in estuarine sediments from the North Inlet Estuary, South Carolina (Stevenson et al. 1972) and 1 to 3 orders of magnitude lower than total direct counts in intertidal sediments (Dale 1974). Again the grain size probably had a significant influence on bacterial numbers in sediments. Figure 19 showed that there was a general increase in the viable cell counts with time in the middle tidal zone at the site. Because of the heterogeneity in the system, it cannot be determined if there is a significant difference between the bacterial populations in the planted and non-planted plots. Unlike the microbial biomass (ATP) data, there was a slight lag (January through May) before the bacterial populations started to increase (Figure 18).

77. The dredged materials at Buttermilk Sound were essentially aerobic from January to March or April. However, during the summer months black iron sulphide zones were noticed in the substrata and it was expected that the facultative anaerobic population would increase relative to aerobic population. The data plotted in Figure 18 indicated that there was no significant difference between the numbers of facultative anaerobes and aerobes. Several reasons may account for the low facultative anaerobic bacterial population: (1) 2216 Marine Agar is a selective medium possibly preventing the expression of only certain aerobes and anaerobes; (2) sensitivity of strict anaerobes to O_2, and (3) fastidious nature of bacteria requiring essential vitamins and minerals not provided by the medium. Thus, the procedure allows for only the expression of certain facultative bacteria.

Yeast biomass

78. The relative abundance of the yeast population in the middle

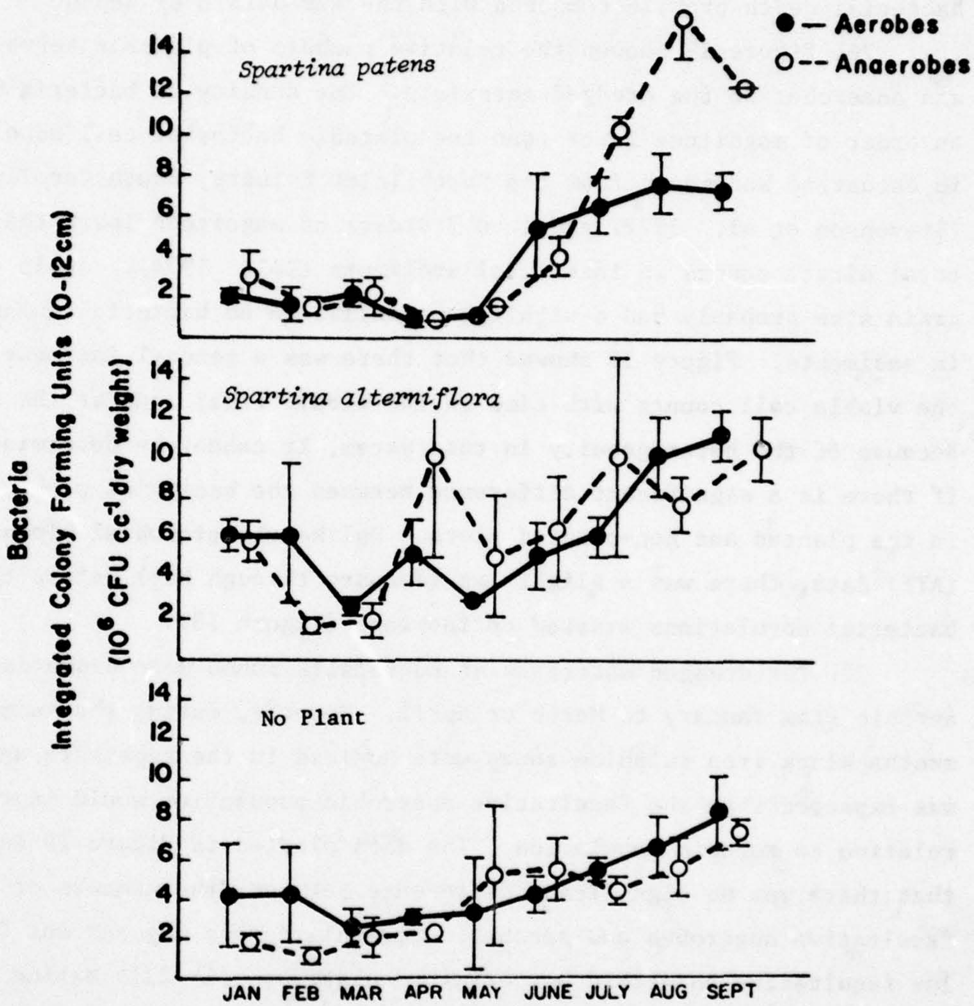


Figure 19. Integrated number of bacteria in the top 0-12 cm of dredged materials from *S. patens*, *S. alterniflora*, and no plant plots in middle third of the tidal zone. Vertical bars represent SE for 3 cores.

tidal zone was also followed with respect to sediment depth and time (Figure 20). The yeast population decreased with depth similar to bacterial populations and ATP concentrations. The yeast population was approximately an order of magnitude lower than the bacteria population. Again there was essentially little difference between planted and non-planted plots and the abundance of yeast (Figure 21). Unlike the ATP and bacterial data, there was an obvious drop in yeast counts during May. The reason was not known, but the decline was gradual with a sharp rise in June. In the sediments of Barataria Bay, Louisiana, 10^4 viable yeast cells per g wet sediment were not uncommon (Meyers et al. 1971).

Algal Populations

79. Diatom genera on the sediment surface are listed in Table 20. Over the nine month period 25 different genera were recorded. Of these genera diatoms of the genus *Navicula* was present each month during the sampling period. Several other genera were often present: *Fragilaria*, *Melosira* and *Diploneis*. The mean number of genera noted for any one month over the sampling period showed a seasonal frequency distribution. Approximately seven different genera were found between April and July 1976, whereas fewer genera were present from January through March and August through September. There are probably many variables (shading, illumination, standing water, salinity, etc.) which effect diversity of diatom communities.

80. Blue-green algae were enriched from surface sediments. The Order Oscillatoriacae was the most frequent group observed in the enrichment. Other algae although not found in the enrichments were no doubt present at the site.

Summary

81. Tides are thought to provide some energy requirements to heterotrophs ard to enhance the overall productivity of coastal ecosystems by the deposition of detritus and constant flushing of the system (Odum, 1971). Tidal deposition of detritus also enriches the

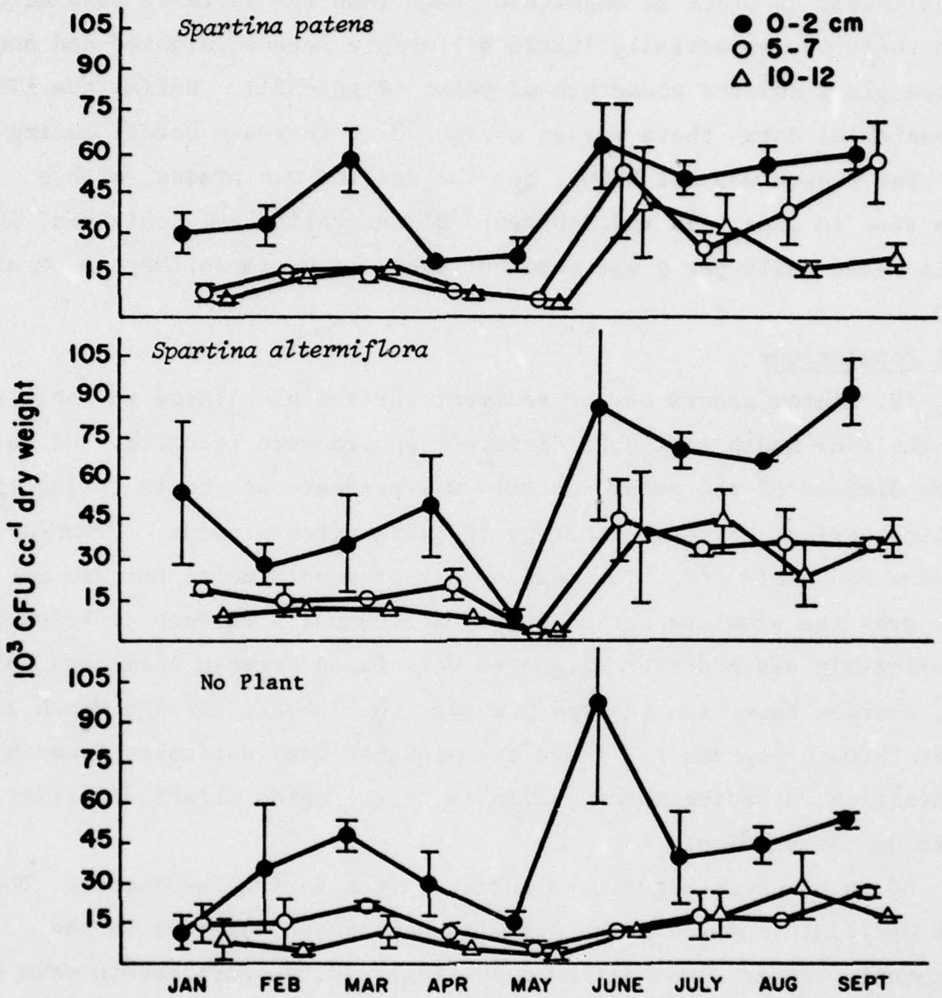


Figure 20. Yeast biomass (CFU) in *S. alterniflora*, *S. patens*, and no plant plots in the middle tidal zone.

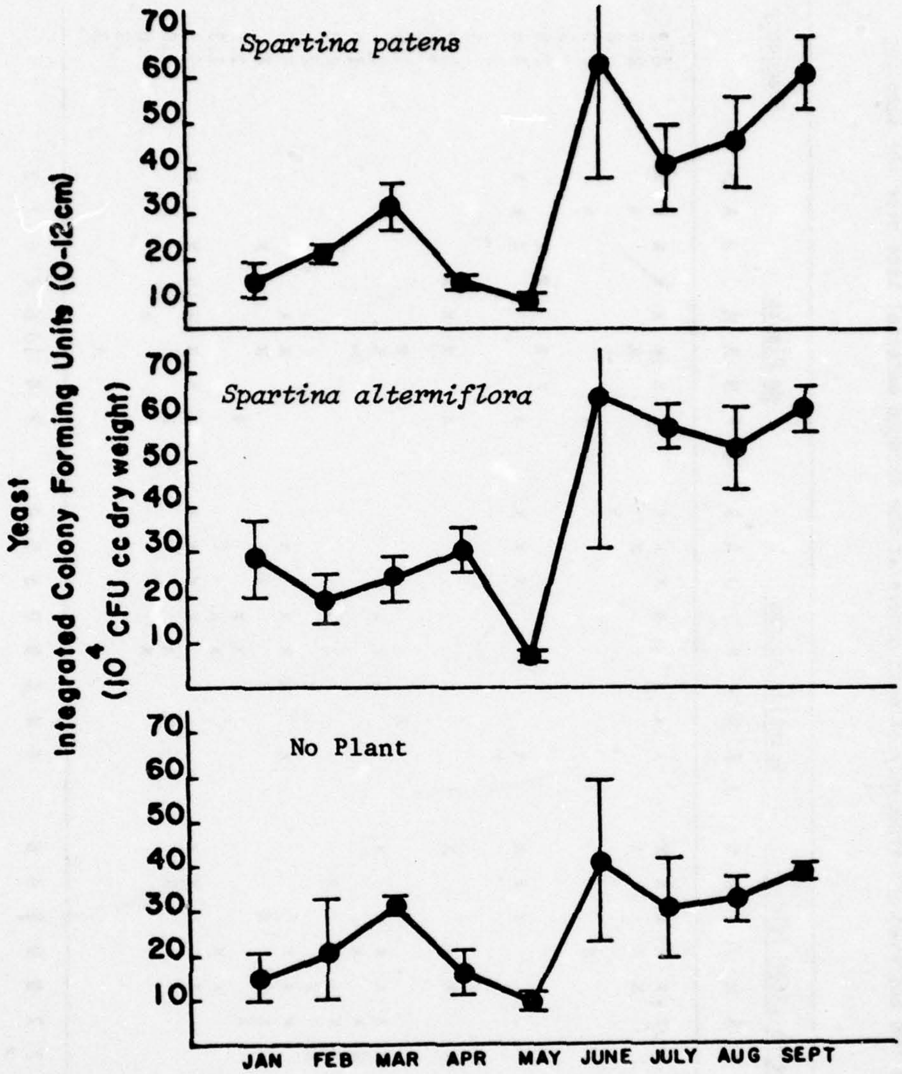


Figure 21. Integrated number of yeast in the top 0-12 cm of dredged materials from the middle tidal zone. Vertical bars represent the SE for 3 cores.

Table 20. Genera of diatoms observed and frequency of each genera at the dredged material site over the sampling period.

	Spartina alterniflora									*Spartina patens*									No Plants									Frequency
	J	F	M	A	M	J	J	A	S	J	F	M	A	M	J	J	A	S	J	F	M	A	M	J	J	A	S	
Navicula sp.	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	8.3
Pleurosigma sp.		x			x	x		x	x								x					x				x		2.6
Amphipleura		x																x										.6
Epithemia sp.		x				x														x						x		1.3
Amphiphora sp.		x																										.3
Cocconeis sp.		x												x	x	x					x	x		x	x			2.6
Melosira sp.	x	x					x	x	x		x					x	x	x		x					x	x	x	4.6
Flagellaria sp.	x	x									x																	1
Terpsione sp.	x																											.3
Cyclotella sp.	x		x		x	x			x				x							x		x	x	x				3.3
Gyrosigma sp.	x																											.3
Coscinodiscus sp.			x									x										x						1.3
Achnanthes sp.			x	x	x	x	x		x				x	x	x							x						3
Frustulia sp.			x	x		x																						1
Nitzschia sp.			x	x	x	x		x						x	x													2.3
Amorpha			x		x							x	x															2
Diploneis				x	x	x					x		x	x	x		x					x	x					3.6
Denticula sp.				x			x						x			x						x			x			2
Chaetocerous sp.				x										x	x					x								1.3
Hantzschia sp.					x	x								x	x													1.3
Fragilaria					x		x	x	x						x	x	x	x		x	x	x	x	x	x	x	x	5.3
Diatoma								x				x		x						x						x		1.6
Gomphonema														x									x					.6
Mastogloia																				x								.3
Eunotis																						x						.3
Total No. Genera	7	8	7	7	9	9	5	6	6		4	4	6	9	8	5	5	4		7	4	10	6	6	6	7	3	
Mean No. Genera	6	5.3	7.6	7.3	7.3	6.3	5.6	4.3																				

benthic habitat with microorganisms and macrofauna which enhance the productivity of the system by cycling essential plant nutrients. These organisms may be more important in returning nutrients to plants than rivers and oceanic waters (Windom et al. 1974). For example, some studies done in Georgia marshes indicate that the annual *Spartina* production is supported by nutrient cycling within marsh soils (Chalmers et al. 1976; Haines et al. 1975). Therefore, nutrient regeneration and tidal input of organic detritus should play an essential role in salt marsh plant establishment.

82. The results of this study indicated a general increase in biomass and viable cell numbers in recently exposed dredged materials at Buttermilk Sound. There was a decrease in microbial biomass and numbers with depth suggesting that major input of organic carbon (algal and detritus) was from the surface. In addition, it appeared that the increase in microbial biomass over time was not related to in situ plant growth. Sedimentation rate of detritus on the site was not measured so there was no way to estimate detrital input.

83. Results were used to estimate microbial biomass accumulation in dredged materials at Buttermilk Sound. It was found that approximately 4μg ATP cm^{-2} accumulated during the nine months, equivalent to 5.3 μg ATP cm^{-2} yr^{-1}. Assuming a conversion factor for ATP to carbon (1:250), it was calculated that microbial biomass accumulated at a rate of 13.3 g C m^{-2} yr^{-1}. If organic carbon was accumulating at the same rate in the dredged material at Buttermilk Sound as in the dredged material near Drum Inlet, N.C. (Cammen, 1976b), then microbial biomass would represent approximately 15 percent of the carbon deposited at the site. In addition, it was estimated that approximately 1.3×10^7 bacterial cells cm^{-2} accumulated over the year. Assuming 2×10^{-13} g C $cell^{-1}$ (Luria, 1960) and approximately 1 percent of the bacteria were culturable, it was calculated that bacterial carbon accumulated at a rate of 2.7 g C m^{-2} yr^{-1} or 20 percent of the microbial biomass in the upper 12 cm of the dredged materials. Similar calculations were made for the yeast populations at Buttermilk Sound. Yeast biomass, based on 5.3×10^5 cells cm^{-2} yr^{-1} and assuming 4×10^{-3} g C $cell^{-1}$

accumulated at a rate of .21 g C m^{-2} yr^{-1} or 1.0 percent of the microbial biomass.

84. These calculations indicated that approximately 22 percent of the microbial biomass was accounted from by bacterial and yeast counts. Algae, diatoms, meiofauna and macrofauna represented the remaining 78 percent of the biomass in the dredged material. Unfortunately, there was no adequate estimate of algal biomass because of the difficulty in differentiating between phaeophytin and chlorophyll a. Meiofaunal biomass in the salt marshes adjacent to Sapelo Island ranged from 0.2 to 7.6 g C wet wt./m^{-2} (Teal and Wieser, 1966). Cammen (1976a and c) reported that macrofaunal biomass in dredged material planted with *Spartina* was generally less than 1 g C dry wt. m^{-2}. Thus, algal and diatoms probably represented a significant fraction of the biomass in the dredged material at Buttermilk Sound.

PART VIII: EXPERIMENTAL PLANT ANALYSIS

Introduction

85. The value of coastal wetlands, in particular salt marshes, in providing detrital and other food sources for marine organisms (Odum and de la Cruz 1967, Odum 1961), in nutrient cycling (Williams and Murdock 1969, Reimold 1972, Wiegert et al. 1975) and in providing nursery grounds for marine organisms (Teal 1962) is well documented. The benefits from these marshlands have fostered much research to quantify the primary productivity and subsquent transmission to estuarine waters (Keefe 1972, Reimold and Linthurst 1977, Reimold et al. 1975). The ultimate conversion of wetlands primary production to secondary production in terms of fish, shrimp and shellfish in the estuary suggests the potential adverse consequences of wetlands destruction (Odum and Skjei 1974). Mounting evidence linking wetlands export (Teal 1962, Day et al. 1973), detritus enrichment (de la Cruz 1965, Odum 1970) and ultimate ingestion and assimilation (Darnell 1958, Odum and Heald 1972) indicates wetlands preservation to be a sound management practice (Odum and Skjei 1974) and advances the potential benefits of wetlands construction.

86. A large number of wetlands restoration or construction projects have been attempted in the United States (Garbisch 1977). Both scientific and commercial construction has resulted in generally good success and optimism toward marsh habitat development. The use of dredged material as a substrate for marsh construction was successfully accomplished in North Carolina by Woodhouse et al. (1974).

87. The present study addressed a number of alternatives for marsh propagation on dredged material. The first concern was to select a variety of marsh plants indigenous to Georgia marshes which represented a wide range of elevational regimes within the intertidal zone. The inclusion of a variety of plants facilitated the stabilizing of dredged material over a wider range within the intertidal zone. A second concern was the most efficient and economical propagule type (transplanted sprigs or seeds). The necessity of fertilization to ensure success of the propagules

was a third concern. Incorporation of all these factors into the experimental design helped to answer pertinent questions concerning the successful establishment of marsh habitat and ultimate development of an ecologically sound and biologically productive marsh system.

Methods

88. Seven marsh plant species were selected to represent vegetation ranging in the intertidal zone from mean tide level (*Spartina alterniflora*) to the spring tide level at the marsh upland interface (*Iva frutescens*). Experimental species included *Borrichia frutescens* (L.) DC. (Sea oxeye), *Distichlis spicata* (L.) Greene (Spikegrass), *Iva frutescens* L. (Marsh elder), *Juncus roemerianus* Scheele (Black needle rush), *Spartina alterniflora* Loisel (smooth cordgrass), *Spartina cynosuroides* (L.) Roth (Rough cordgrass), and *Spartina patens* (Ait.) Muhl. (Salt meadow hay). Some plant species exhibited rapid spreading ability, some a slower erosion-resistant spreading rate, some were woody stemmed shrubs and others were grasses. This assemblage of different marsh plant types assured a wider elevational range could be stabilized and the final marsh would resemble a natural marsh in terms of species zonation.

Transplantation

89. Transplantation of the marsh plant sprigs was completed late in June, 1975. The extremely hot weather conditions during the transplanting operation heightened transplant shock and reduced transplant survival. Sprigs were dug fresh daily from marshes adjacent to the study site, from Brunswick, Georgia or from Sapelo Island, Georgia and transplanted on to the site. Sandy areas, where plant stands were newly colonizing, were selected for collection of sprigs because of the relative ease in obtaining singular culms. Each transplant was composed of a single culm of medium height for the species and as much root material as could easily be retained. Root material was seldom excessive on the transplants, however occasionally a rhizome had to be cropped to facilitate transplanting.

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HABITAT DEVELOPMENT FIELD INVESTIGATIONS BUTTERMILK SOUND MARSH--ETC(U)
JUL 78 R J REIMOLD, M A HARDISKY, P C ADAMS DACW21-75-C-0074

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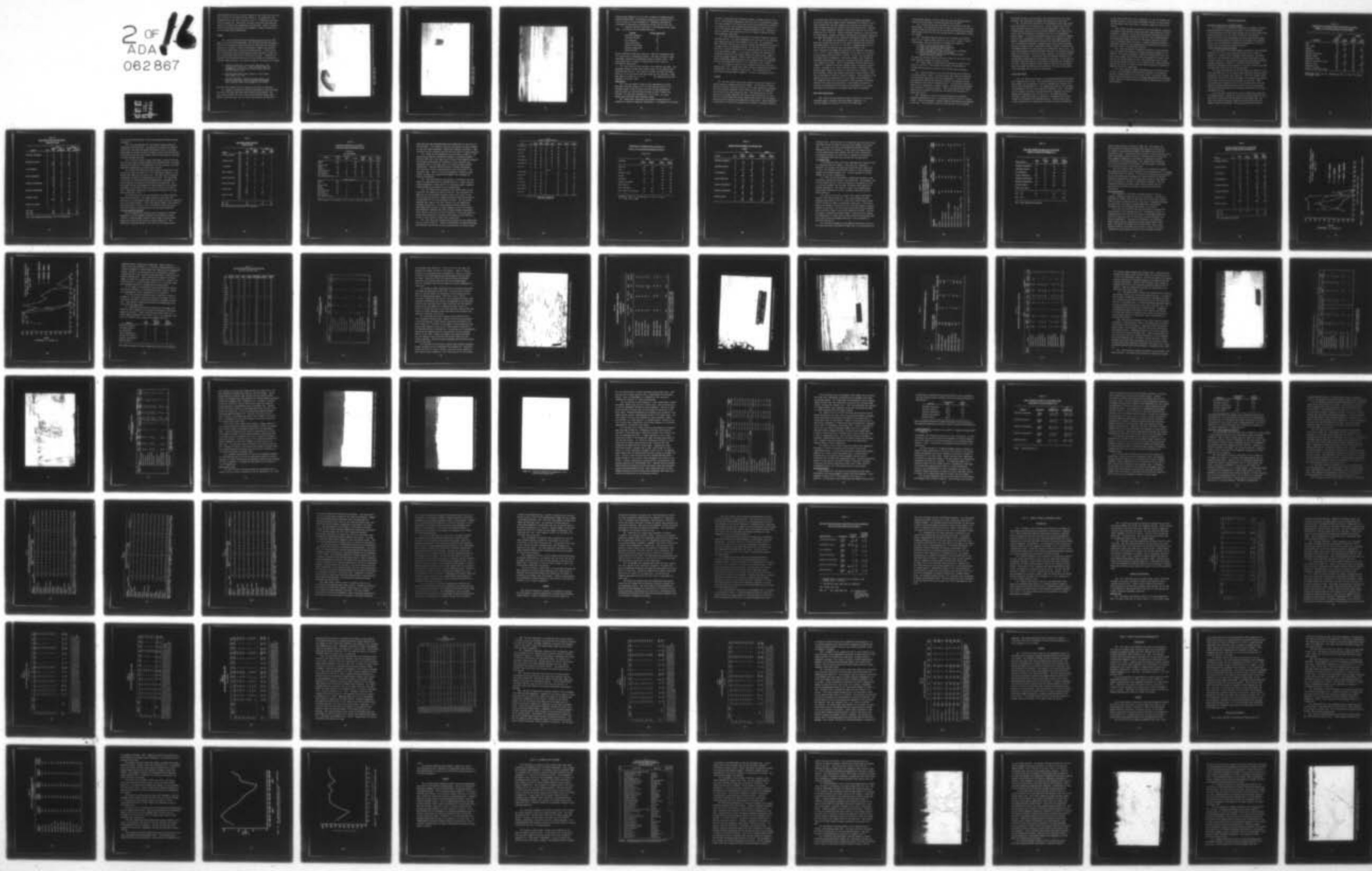

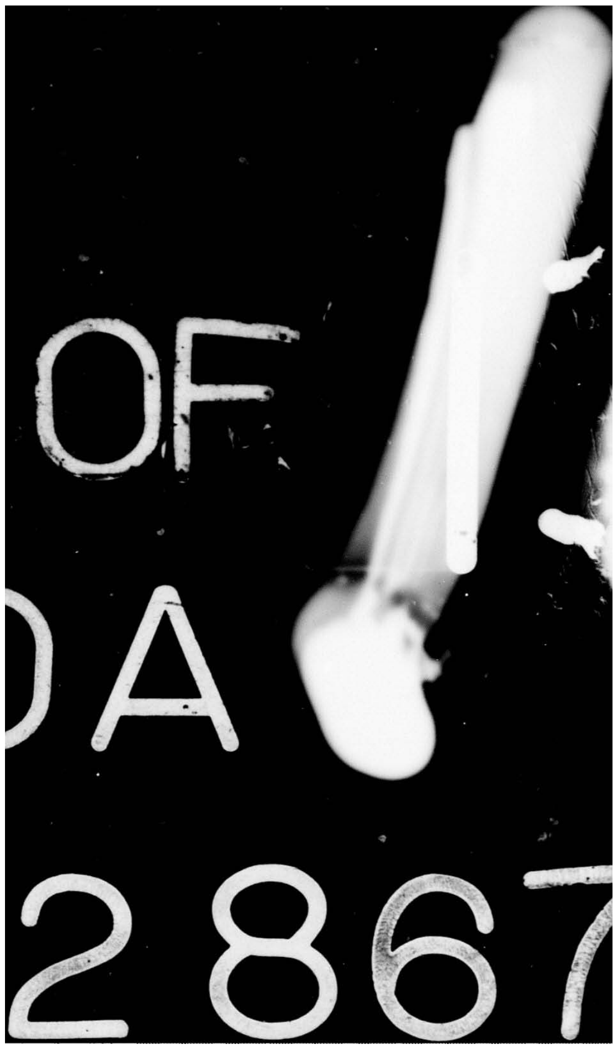
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The appropriate fertilizer treatment (Figure 22) was spread over the entire plot (1.5m by 3m) and raked into the substrate. The sprigs were then transplanted on 0.5m centers yielding 2 rows of 5 transplants each within the plot (Figure 23). The control (no plant) plots were fertilized and raked but no plants were transplanted into the plots. Figure 9 depicts the site layout and a listing of the treatments. Figure 24 depicts the site two weeks after transplanting.

Seeding

90. The collection of seeds for planting during the spring of 1976 began in July for *Juncus roemerianus*. During August *Borrichia frutescens* seeds were collected and during September *Iva frutescens* and *Distichlis spicata* were collected. *Spartina alterniflora, Spartina cynosuroides,* and *Spartina patens* were all harvested during October. In many cases, seed collection was after shattering had occurred therefore a large volume of glumes were collected with relatively few seeds. Collection in accordance with local maturation dates of each species was necessary for efficient seed collection. Over winter storage of the seeds was as follows:

a. *Spartina alterniflora*--cold storage immediately after collection (2 to 4°C dry). After one month seeds were threshed and stored in 15 o/oo "Instant Ocean" water at 2 to 4°C (Seneca, 1974).

b. *Spartina cynosuroides*--cold storage in 5 o/oo "Instant Ocean" water (2 to 4°C).

c. *Borrichia frutescens, Distichlis spicata* (Amen et al. 1970) *Iva frutescens, Juncus roemerianus* and *Spartina patens* (Seneca, 1969)--cold storage at 2 to 4°C dry.

The seeds were removed from cold storage one day prior to planting.

91. Studies to determine germination potentials of seeds collected for each of the seven salt marsh plant species were initiated. The first study utilized 5 ml of the seed and glume mixture between damp sheets of absorbant paper and the second study required the planting of

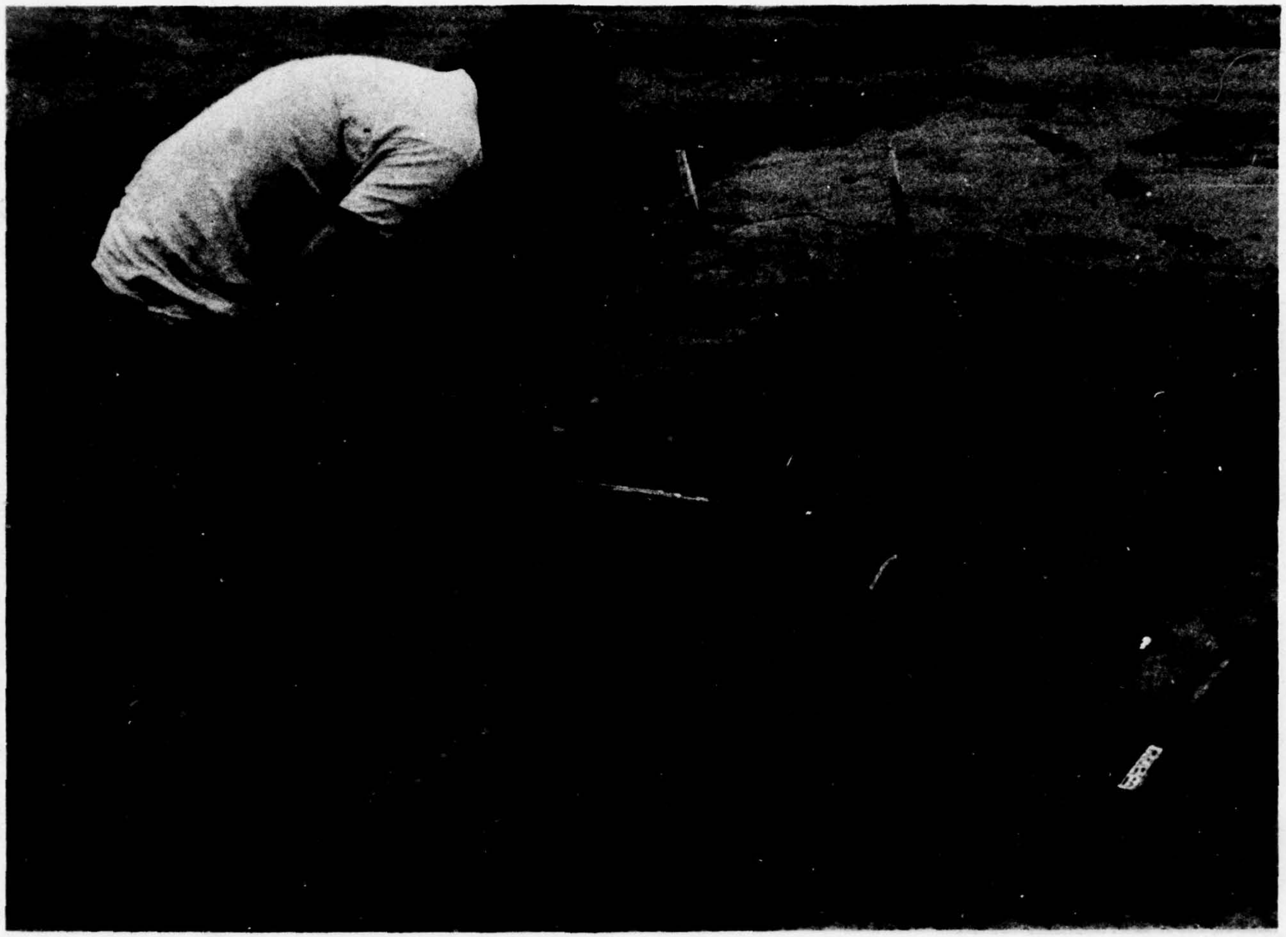

Figure 22. After broadcasting the appropriate fertilizer application, each plot was raked before planting.

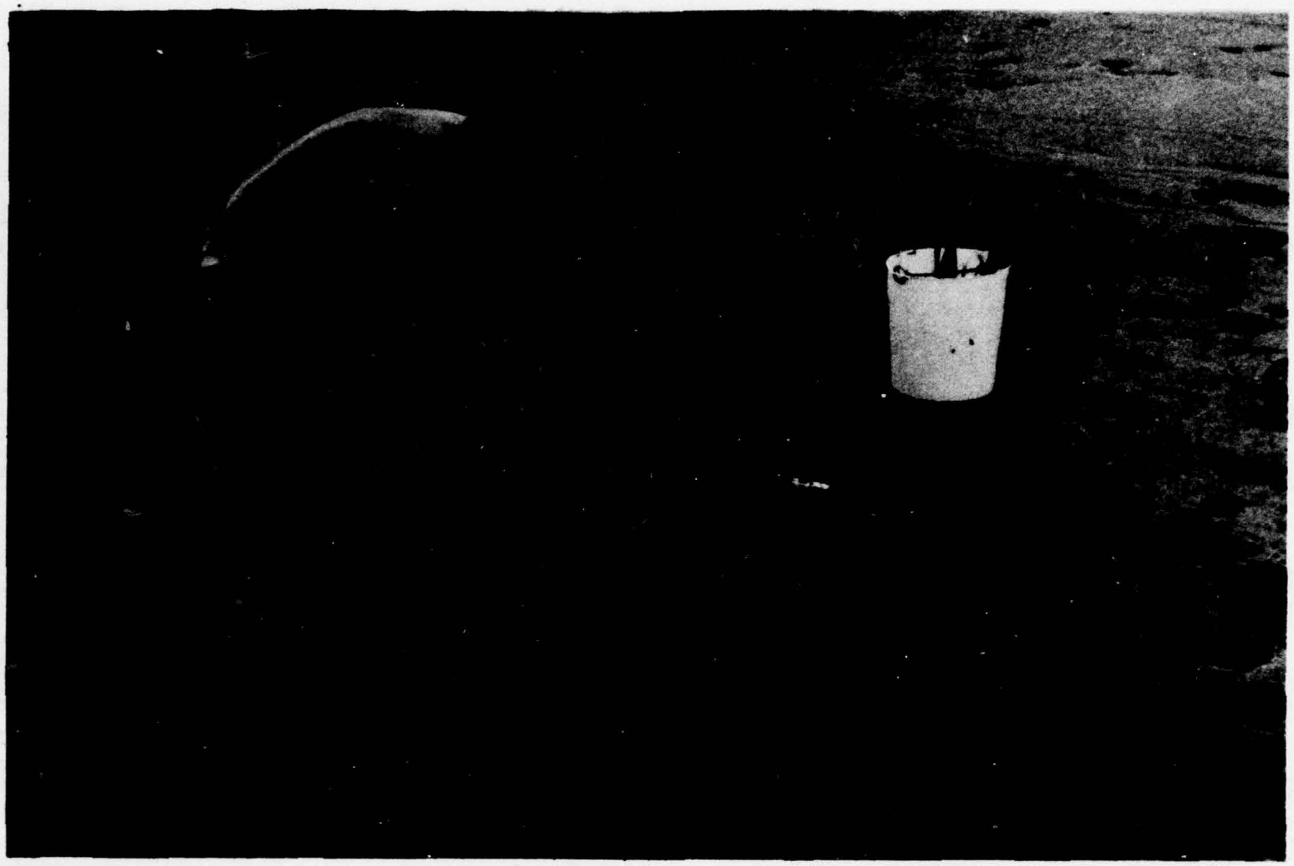

Figure 23. Transplants were placed on 0.5 m centers forming two rows of five plants each within each plot.

Figure 24. Site several weeks after transplanting. View is south.

measured seed volumes at 1,2,3,4, and 5 cm depths in dredged material from Buttermilk Sound. Both methods experienced an alternating 20° to 10°C, 17 hours to 7 hours thermoperiod. Germination frequency was determined by observation of epicotyl protrusion from the seed coat.

92. From the laboratory estimates, it was determined that viable seeds were planted at the following densities:

Species	Seeding density/m^2
Borrichia frutescens	33
Distichlis spicata	10
Iva frutescens	265
Juncus roemerianus	0
Spartina alterniflora	74
Spartina cynosuroides	12
Spartina patens	0

Juncus roemerianus seeds were exposed to a 200 watt incandescent lamp for 3 hours prior to germination studies. This was to fulfill a light requirement necessary for germination (Seneca, personal comm.). The only species able to tolerate a seeding depth of more than 2 cm was *Spartina alterniflora*.

93. Fertilizer was first applied to the substrate and raked. The seed/glume mixture was mixed with a small amount of wet substrate and broadcast over the plot. This helped to protect the seeds from being blown out of the plot before they were raked into the substrate. Seeds were raked to a depth of 1 to 3 cm. The seeding operation was completed on 26 April 1976.

Stem density

94. Live culm density counts in each experimental plot were performed bi-monthly using a 0.1 m^2 circular quadrat except for *Iva frutescens* where a 0.25 m^2 quadrat was used and some transplanted *Spartina patens* and *Distichlis spicata* where a 0.01 m^2 quadrat was utilized. All data were expressed on a 1.0 m^2 basis. All culms having green coloration were considered living.

95. Marsh plants (especially the grasses) relied heavily on rhizomes as a means of vegetative reproduction. A consequence of this trait

was that a colonizing plant stand would possess a clumped population structure. The individual aggregations were the result of young shoots growing in close proximity to the parent plants which had propagated from rhizomes. As a result of this very heterogeneous growth pattern, sampling with 0.1 or 0.01 m^2 quadrats was biased to include a vegatative clump. Sampling in this way inflated stem densities during early stages of growth but maintained sampling consistency.

96. The clumped pattern persisted for different lengths of time for different species. All plants transplanted onto the site in 1975 exhibited the clumped structure for the remainder of the year. By the spring of 1976, *Distichlis spicata*, with its many rhizomes, had dispersed sufficiently to negate some of the sampling problems. By the fall of 1976, *Borrichia frutescens*, *Spartina alterniflora*, and *Spartina patens* all had lost most of the dense parent clumps. At this time the seeded plots resembled the transplanted plots after one growing season, all species being clumped around the original seeding. Spring of 1977 left only *Iva frutescens* and *Juncus roemerianus* transplanted plots still clumped and all but *Borrichia frutescens* and *Distichlis spicata* of the seeded plots still clumped.

97. No changes in status of the transplanted plots was seen from spring to fall 1977. Seeded plots added *Spartina alterniflora* and *Spartina cynosuroides* to the unclumped classification. The irregularities in plant pattern required sampler judgement to select a representative area.

Biomass

98. The most widely used and most commonly accepted description of plant response or community health was biomass. This parameter could be measured accurately, and with relative ease for many wetland plant species. The aerial biomass considered in this study was the grams dry weight per square metre of all above ground material. The normal practice of separating live and dead components was ignored since during the first two years of the study high tidal energy removed dead portions from the sparse vegetation thus eliminating any appreciable accumulation. Some accumulation of dead matter as litter and standing dead occurred for individual species

in the third year (1977) and was included in the biomass measurement. The aerial biomass and changes thereof represented and estimated the combined standing live and dead components of production but adequate measures of production were not possible within the planted areas. Determination of aerial biomass was limited to semi-annual harvests, one in the spring and one in the fall. Quadrat sizes were identical to those described for stem density. Methods for clear cut harvesting and subsequent drying for dry weight determinations were according to Reimold and Linthurst (1977).

99. Root biomass was expressed as a dry weight biomass per square meter and included all portions of root matter excavated from within the appropriate quadrat (0.01 or 0.1 or 0.25 m^2) to a maximum depth of 45 cm. The root matter and substrate were then washed through a 1 mm sieve, root matter was bagged and returned to the laboratory (Gallagher, et al., 1977). A more thorough washing of the root matter in the laboratory was usually necessary prior to drying. In every case the sampled root matter was the complement of the aerial biomass. Root biomass was determined semi-annually for any plot containing sufficient vegetation for a destructive harvest. One of the objectives of marsh habitat development was to stabilize the barren dredged material and prevent further erosion. Gallagher et al. (1977) conducted studies to determine below ground biomass dynamics in relation to stabilization of sediment. Plants with spreading, fibrous and somewhat shallow root systems seemed to work best in providing an anchor for alluvial sediments. With knowledge of the spacial structure and components of a root system, the measurement of root biomass proved to be a good indicator of the substrate stabilizing ability of the plant species evaluated. Stabilization and accretion were two very important processes directly attributable to root system development and necessary for successful marsh habitat development.

Other Plant Measurements

100. Basal area was determined using a Starrett No. 1010 pocket thickness guage to determine the basal diameter (measured 1 cm from soil surface) to nearest 0.1 mm, of ten random stems

from each plot sampled. The mean basal area per stem (cm^2) was multiplied by the stem density to yield the basal area in cm^2/m^2.

101. The percent survival was based on the survival of the ten ginal sprigs. The survival was based on visual observations of the transplanted sprigs and therefore did not include those sprigs which appeared dead during a portion of the first growing season but maintained a living root system.

102. The plant condition index served to indicate the relative health of the original sprigs during the first year of growth. The following numeric codes were averaged to determine mean condition:

0 = absent, aerial and root matter absent
1 = dead, only standing dead matter remaining
2 = dying, less than 50% of plant living
3 = stable (stressed), chloratic and dead leaves are abundant
4 = stable, healthy green leaves are abundant
5 = new growth, healthy vigorous plants having new growth and/or producing new shoots.

The condition index was somewhat subjective however it did serve to document transplant health and ultimate survival.

103. Shoot height was determined by measuring the height of ten plants in each plot. Shoot height was defined as the distance in cm from the soil surface to the tip of the tallest leaf or inflorescence.

104. General estimates of the macroinvertebrates were limited to crab burrow density counts. The burrow counts were used as an indicator of crab presence and relative activity proportional to burrow density. *Uca pugnax* (mud fiddler) and *Sesarma reticulatum* (squareback) were the most abundant crabs found at Buttermilk Sound. *Uca pugilator* (sand fiddler) was also present but in smaller numbers. Burrow densities reflected the sum total of all species present. Crab burrow densities were determined using the quadrats described for stem density and expressed on a square metre basis.

105. Elevations on the site were determined from a temporary benchmark established by the U. S. Geological Survey on Little St. Simons Island. From this benchmark, a similar temporary benchmark was established on the site. The elevation of each plot was the mean of five readings

from within the plot, one near each of the corners and one in the center. Elevations were determined in December 1975 and again in April 1977.

106. By the fall of 1976 many of the experimental plants had spread beyond the borders of the original plot. During the winter of 1977 the area occupied by each species on the site was quantified. Most of the invading species (annuals) had died and been removed by the tides by late winter, thus facilitating the delineation of each of the experimental species stands. A staff was positioned within a plant stand and a compass placed on top. At ten degree intervals a transect was sighted to the perimeter. Species such as *Borrichia frutescens* and *Distichlis spicata* had very discontinuous perimeters (singular plants along rhizomes extended as much as a metre from the stand proper) however transects recorded every five degrees produced only an average ± 7% difference in overall area. The extra time required to measure five degree intervals was excessive when compared to the increase in overall accuracy, therefore, all areas were based on ten degree intervals. Each species stand was measured separately even though several species may have overlapped in some areas. If two plots of the same species coalesced, the total area was divided and half assigned to each plot. Transect lengths for each stand were plotted on polar coordinate graph paper and the end points connected. The area was determined using a planimeter and recorded as square metres.

Statistical Design

107. The statistical design of the experimental area was a split-split plot randomized block design. The blocking factor was elevation (3 intertidal zones) and the randomized factorial treatments were; species, fertilizer level, and propagule type. The transplanting half of the experiment was performed in 1975 and the seeding half performed in 1976. The difference in response time made a balanced statistical comparison of the propagule types impossible over the entire 2.5 year sampling period. Therefore, a balanced statistical comparison of propagule types was performed for the November 1977 sampling interval. Theoretically, plant swards originating from transplanted or seeded stock would at some point

in time reach a steady state and be identical. We felt the November 1977 sampling interval to most closely approximate the point in time (within the experimental time frame) when an equitable comparison could be performed.

108. Normal seasonal fluctuations in live stem density, flowering stem density, and crab burrow density provided large variations of these parameters. Therefore, statistical analyses were performed by the seasons of spring (January through June) and fall (July through December). The seasons were chosen such that one semi-annual destructive harvest would be contained within each season. Seasonal groupings eliminated cumbersome analyses of each sampling date and maintained the seasonal expression of many of the parameters measured.

109. Live stem density, flowering stem density, crab burrow density, and biomass were measured at regular intervals throughout the experiment. The remaining dependent variables including basal area, survival, shoot height, and condition index were measured at regular intervals but for varying lengths of time. The unbalanced nature of these data and the seasonal intervals (3 fall intervals and 2 spring intervals) necessitated the use of a general linear models procedure as opposed to ANOVA for statistical comparisons.

110. Anova analyses treated unsuccessful plots as having a value of zero. This stipulation restricted anova analyses to the regularly monitored variables where zero values were valid. The general linear models treated unsuccessful plots and missing sampling periods as missing values, therefore, different means were generated depending upon the analysis employed.

Results and Discussion

Statistical comparison of treatment effects

111. Discussion of statistical comparisons of dependent variables among experimental treatments will proceed in the following manner: a) live stem density and crab burrow density over the entire experimental period by seasons with a year effect included, b) all dependent variables over the entire experimental period by seasons and propagule type, c) live stem density and biomass for the November 1977 sampling period. Part (a) includes only transplanted propagules and (b) and (c) include both transplanted and seeded propagules.

a. Live stem and crab burrow density

112. The analysis of variance (ANOVA) and means for each treatment combination for live stem and crab burrow density can be found in Appendix C. A summary of the treatments tested (species, fertilizer, zone, year) for transplanted plots and the significance level of each is found in Table 21. Each seasonal grouping for stem density described identical significant treatments. Crab burrow densities showed significant differences among treatments for the fall season but yielded no significant differences for the spring season.

113. Mean stem densities for the fall season were largest in the upper intertidal zone for all species except *Spartina alterniflora* which was greatest in the middle zone (Table 22). *Distichlis spicata, Juncus roemerianus,* and *Spartina patens* had significantly higher stem densities in the upper zone than in either the middle or lower zone. Mean stem densities were somewhat lower for the spring season but the same species had significantly high mean densities as in the fall season. This relationship indicated that stem density differences were evident throughout the year.

114. Crab burrow densities for the fall seasons also varied with the intertidal zone. Significant increases were seen between the lower zone and the middle zone, and the middle zone and upper zone. The three plant species having the highest stem densities also had the highest crab burrow densities. The low mean crab burrow densities

Table 21.

Significance of Treatments from the Analysis of Variance (ANOVA) for Crab Burrow Density and Stem Density

Treatments	Fall Crab Burrow Density	Fall Stem Density	Spring Crab Burrow Density	Spring Stem Density
Year	***	****	NS	*
Zone x Year	**	---	NS	---
Species	**	****	NS	****
Fertilizer	NS	---	NS	---
Species x Fertilizer	NS	NS	NS	NS
Species x Zone	****	****	NS	****
Fertilizer x Zone	NS	---	NS	---
Species x Fertilizer x Zone	NS	NS	NS	NS
Species x Year	***	****	NS	****
Fertilizer x Year	NS	---	NS	---
Species x Fertilizer x Year	NS	NS	NS	NS

Probability level: NS = no significance; 0.05 = *; 0.01 = **; 0.001 = ***; 0.0001 = ****

Table 22.

Mean Seasonal Stem and Crab Burrow Densities by Zone

Species	Zone	Fall Stems /m²	Fall Crab Burrow/m²	Spring Stems /m²	Spring Crab Burrow/m²
	1	1	0	0	0
Borrichia frutescens	2	17	11	8	0
	3	55	14	36	1
	1	1	0	0	0
Distichlis spicata	2	28	8	24	0
	3	1036	29	467	4
	1	0	0	0	0
Iva frutescens	2	26	7	3	1
	3	44	13	3	0
	1	0	0	1	0
Juncus roemerianus	2	10	4	3	0
	3	569	13	145	0
	1	58	14	1	0
Spartina alterniflora	2	99	31	11	4
	3	26	12	12	0
	1	0	0	0	0
Spartina cynosuroides	2	8	6	12	0
	3	59	8	24	2
	1	0	0	0	0
Spartina patens	2	6	3	2	1
	3	1784	30	938	3
	1	-	0	-	0
Control (no plant)	2	-	7	-	1
	3	-	9	-	0
LSD 0.05		225	7	111	NS
LSD 0.01		297	9	146	NS

LSD = Least significant difference, NS = Not significant.

for the spring season failed to show any significant difference among treatments.

115. Live stem densities for each species showed significant changes with time (Table 23). All species had increases in densities from 1975 to 1976 with some density decreases in 1977, as the plant stands began to spread and lose the clumped structure seen during 1976. The spring density means were smaller than the fall means but expressed a similar increase with time.

116. *Distichlis spicata, Juncus roemerianus,* and *Spartina patens* were the major species having significantly different means. The large variability between the stem densities of the seven species restricted significant differences to the more dense species.

117. Fiddler and squareback crabs occupied a limited area on the site for the first two years, but in 1977 substantial numbers of crab burrows were found over the entire site. The rapid crab colonization accompanied the influx of invading species in 1977. The association of the plant and crab populations was exemplified by the highest crab burrow densities occurring with the greatest stem densities. The non-planted control areas supported a sparse density of crab burrows as compared to the planted areas noted for all species from 1976 to 1977. Significant burrow density increases were noted for all plant species from 1976 to 1977.

118. Crab burrow and live stem densities both showed increases with time and elevation. The higher elevation (upper zone) was preferred by the experimental plant species (except *Spartina alterniflora*) and by the crab population. Crab burrow density seemed to vary directly with stem density. *Spartina patens, Distichlis spicata,* and *Juncus roemerianus* attained the greatest stem and crab burrow densities.

b. Other dependent variables

119. The significant treatments from the analysis of variance (Appendix C) for the dependent variables from transplanted areas, condition, flowering stems, survival, shoot height, root and aerial biomass were zone, species and zone x species (Table 24). The significant treatments applied to both the fall and spring seasons.

TABLE 23.

MEAN SEASONAL STEM AND CRAB BURROW DENSITIES BY YEAR

		FALL		SPRING	
SPECIES	YEAR	STEMS $/m^2$	CRAB BURROWS $/m^2$	STEMS $/m^2$	CRAB BURROWS $/m^2$
Borrichia frutescens	1975	4	1	-	-
	1976	22	1	4	0
	1977	46	24	2	1
Distichlis spicata	1975	9	1	-	-
	1976	616	3	27	0
	1977	439	34	300	3
Iva frutescens	1975	2	1	-	-
	1976	20	1	1	0
	1977	48	20	3	1
Juncus roemerianus	1975	5	1	-	-
	1976	318	1	5	0
	1977	257	17	93	0
Spartina alterniflora	1975	11	1	-	-
	1976	76	1	12	0
	1977	97	22	27	3
Spartina cynosuroides	1975	3	1	-	-
	1976	35	1	2	0
	1977	29	12	22	2
Spartina patens	1975	12	1	-	-
	1976	1128	2	99	0
	1977	650	31	528	2
Control (no plant)	1975	-	1	-	-
	1976	-	1	-	0
	1977	-	15	-	0
LSD 0.05		175	7	84	NS
LSD 0.01		230	9	110	NS

LSD = Least significant difference, NS = Not significant.

TABLE 24.

Significance of Treatments from the Analysis of

Variance for Buttermilk Sound Dependent Variables

Transplanted

Fall (July-December)

Treatments	Condition Index	Flowering Stems	Survival	Average Shoot Height	Root Biomass	Aerial Biomass
Replicate	****	--	NS	--	NS	****
Zone	****	--	****	--	****	****
Replicate x Zone	*	--	NS	--	NS	****
Species	****	*	****	****	***	****
Fertilizer	NS	--	NS	--	NS	NS
Species x Fertilizer	NS	NS	NS	NS	NS	NS
Zone x Species	****	***	****	****	****	****
Zone x Fertilizer	NS	--	**	--	NS	NS
Zone x Species x Fertilizer	NS	NS	NS	NS	NS	NS
Spring (January-June)						
Replicate	****	--		--	NS	NS
Zone	****	--		--	****	****
Replicate x Zone	**	--		--	NS	NS
Species	****	*		****	****	****
Fertilizer	NS	--		--	NS	NS
Species x Fertilizer	**	NS		***	*	NS
Zone x Species	****	--		****	****	****
Zone x Fertilizer	NS	--		--	NS	NS
Zone x Species x Fertilizer	*	NS		*	NS	NS

Probability Level: NS = not significant; 0.05 = *; 0.01 = **; 0.001 = ***; 0.0001 = ****

These were the same treatments which were significant for stem and crab burrow density. The condition index for both seasons and aerial biomass for the fall season expressed a significant response to replicate. This indicated that the replicates may not have been equal for these variables.

120. Means for each species and zone are found in Table 25. All species except *Spartina alterniflora* showed an increasing gradation from the lower zone to the upper zone of each of the parameters measured. The flowering stem density (an indication of plant maturity) was significant only in the upper zone for all species except *Spartina alterniflora*. *Spartina alterniflora* had an inverse relationship with elevation in that it performed best in the lower third of the intertidal zone. Several of the plant parameters (condition, shoot height, and basal area) described the middle zone as optimum for *Spartina alterniflora*.

121. The relationship of each species to elevational zone was similar for the spring and fall seasons (Table 25). Again, the fall season encompassed a larger portion of the growing season, therefore produced higher overall means than the spring season.

122. The significant treatments for the seeded areas for the spring and fall seasons are found in Table 26. Root and aerial biomass were the only dependant variables tested, due in part to the shorter monitoring period for seeded areas (1.5 years) and the paucity of measurements of the other dependant variables. The fall season indicated zone, species and zone x species to be the significant treatment interactions. The spring season described zone as the only significant treatment for aerial biomass; and for root biomass, the significant treatments were zone, species, species x fertilizer, zone x species, and zone x species x fertilizer. The spring season for seeded areas included only one destructive sampling period which may account for the variety of significant interactions.

123. Root and aerial biomass means by season for each species and zone are found in Table 27. *Spartina alterniflora*, *Spartina cynosuroides* and *Distichlis spicata* were the only seeded species to survive outside

TABLE 25.

Seasonal Plant Performance by Intertidal Zone

Species	Zone†	Condition of Plants	Average Shoot Height (cm)	Flowering stems/m²	Percent Survival	Basal Area cm²/m²	Root Biomass gwd/m²	Aerial biomass gdw/m²
FALL								
Borrichia frutescens	1	1.0	--	0	0	0	0	0
	2	2.3	23	1	43	1.5	11	8
	3	4.6	27	46	—	3.6	224	126
Distichlis spicata	1	1.0	—	0	0	0	0	0
	2	2.5	16	1	100	0.8	2	4
	3	4.6	17	192	---	0.7	308	194
Iva frutescens	1	0	--	0	0	0	0	0
	2	1.4	27	0	10	3.0	10	2
	3	2.3	47	3	34	3.0	118	33
Juncus roemerianus	1	1.9	19	0	25	---	---	---
	2	2.1	24	0	31	0.8	---	---
	3	3.3	40	168	--	1.7	410	456
Spartina alterniflora	1	2.8	32	50	100	2.5	95	145
	2	4.4	37	15	---	3.0	90	153
	3	4.1	26	3	---	2.8	253	60
Spartina cynosuroides	1	1.3	—	0	0	0	0	0
	2	2.0	38	0	66	2.5	---	---
	3	3.1	40	18	--	3.5	178	205
Spartina patens	1	1.3	--	0	0	0	0	0
	2	2.5	23	0	—	1.0	2	1
	3	4.6	40	2	—	1.3	1101	513
SPRING								
Borrichia frutescens	1	0	0	0		0	0	0
	2	3.1	21	0		4.3	1	4
	3	3.8	16	10		4.5	71	68
Distichlis spicata	1	0	0	0		0	0	0
	2	3.9	15	0		2.3	---	---
	3	3.5	13	0		1.6	144	128
Iva frutescens	1	0	0	0		0	0	0
	2	4.8	25	0		---	0	0
	3	2.6	35	0		6.2	0	0
Juncus roemerianus	1	---	42	0		6.5	---	---
	2	---	16	0		---	0	0
	3	3.8	30	55		2.2	55	37
Spartina alterniflora	1	4.4	30	0		4.1	19	39
	2	4.3	25	0		4.3	47	78
	3	3.2	19	0		3.3	14	33
Spartina cynosuroides	1	0	0	0		0	0	0
	2	3.5	30	0		3.7	26	25
	3	2.6	26	0		4.6	55	34
Spartina patens	1	0	0	0		0	0	0
	2	4.3	10	0		2.5	0	0
	3	3.9	23	0		2.2	633	319

† Intertidal Zone 1 = Lower third of intertidal zone.
2 = Middle third of intertidal zone.
3 = Upper third of intertidal zone.

TABLE 26.

Significance of Treatments from the Analysis of Variance for Buttermilk Sound Dependent Variables

Seeded Areas

Treatment	FALL Root Biomass	FALL Aerial Biomass	SPRING Root Biomass	SPRING Aerial Biomass
Replicate	NS	NS	NS	NS
Zone	****	****	***	*
Replicate x Zone	NS	NS	NS	NS
Species	*	*	**	NS
Fertilizer	NS	NS	NS	NS
Species x Fertilizer	NS	NS	**	NS
Zone x Species	*	*	***	NS
Zone x Fertilizer	NS	NS	NS	NS
Zone x Species x Fertilizer	NS	NS	*	NS

Probability level; NS = not significant * = 0.05 ** = 0.01 *** = 0.001 **** = 0.0001.

TABLE 27.

Seasonal Plant Performance by Intertidal Zone

SEEDED

Species	Zone	FALL Aerial Biomass	FALL Root Biomass	SPRING Aerial Biomass	SPRING Root Biomass
Borrichia frutescens	1	0	0	0	0
	2	0	0	0	0
	3	79	65	7	12
Distichlis spicata	1	0	0	0	0
	2	1	1	0	0
	3	111	133	81	79
Iva frutescens	1	0	0	0	0
	2	0	0	0	0
	3	196	170	3	3
Juncus roemerianus	1	0	0	0	0
	2	0	0	0	0
	3	0	0	0	0
Spartina alterniflora	1	0	0	0	0
	2	39	44	4	4
	3	33	42	1	1
Spartina cynosuroides	1	0	0	0	0
	2	14	14	0	0
	3	53	75	6	6
Spartina patens	1	0	0	0	0
	2	0	0	0	0
	3	431	385	107	69

the upper zone. *Spartina patens, Iva frutescens* and *Distichlis spicata* performed the best in terms of root and aerial biomass in the upper zone. No *Juncus roemerianus* seeds germinated, therefore biomass measurements were not available. In most cases the biomass levels of each seeded species were somewhat less than their transplanted counterparts; however, the extra year of response time available to the transplanted areas may have accounted for the differences.

c. November 1977

124. During the final destructive sampling period (November 1977) all surviving plots were sampled. Some plots were completely destroyed, but overall this sampling provided the most complete set of data. The treatments presented were limited to those including species and included propagule type. Complete analysis of variance (ANOVA) can be found in Appendix C.

125. Plant and macroinvertebrate response was greatest to zone (elevation), species and species x zone (Table 28). The propagule type for each species failed to show any significant difference for stem or crab burrow density and only small differences were detected by biomass measurements. This tended to support the assumption that plant stands originating from both propagule types would rapidly become identical.

126. *Spartina patens* had a significantly higher stem density than any other species (Table 29). The large variation in stem densities among species (*Spartina cynosuroides* $29/m^2$-*Spartina patens* $631/m^2$) limited the number of significant differences. Crab burrow density was highest in *Distichlis spicata* plots and lowest in the non-planted control areas. The six species other than *Distichlis spicata* had a very narrow range of crab burrow densities ($8\text{-}11/m^2$). *Spartina alterniflora* produced the greatest amount of aerial and root biomass. The combination of a wider survival range (within the intertidal zone) and a high survival percentage contributed to the performance of *Spartina alterniflora*.

127. Species performance by stem density and biomass in each of the intertidal zones illustrated the upper zone to be preferred by all

TABLE 28.

SIGNIFICANCE OF TREATMENTS FROM THE ANALYSIS OF VARIANCE (ANOVA) FOR THE DEPENDENT VARIABLES FROM BUTTERMILK SOUND, NOVEMBER 1977.

TREATMENTS	STEM DENSITY	CRAB BURROW DENSITY	AERIAL BIOMASS	ROOT BIOMASS
Zone	*	**	**	**
Species	****	****	****	***
Species x Fertilizer	NS	NS	NS	NS
Species x Propagule	NS	NS	*	*
Species x Fertilizer x Propagule	NS	NS	NS	NS
Species x Zone	****	****	****	****
Species x Fertilizer x Zone	NS	NS	NS	NS
Species x Propagule x Zone	NS	*	***	NS
Species x Fertilizer x Propagule x Zone	NS	NS	NS	NS

PROBABILITY LEVEL NS = not significant, 0.05 = *, 0.01 = **, 0.001 = ***, 0.0001 = ****

TABLE 29.

MEAN PLANT BIOMASS AND DENSITY AND CRAB BURROW DENSITY BY SPECIES FOR NOVEMBER 1977

Plant Species	Stems /m^2	Crab Burrows /m^2	Aerial Biomass gdw/m^2	Root Biomass gdw/m^2
Borrichia frutescens	35	9	81	99
Distichlis spicata	247	23	70	75
Iva frutescens	42	11	106	127
Juncus roemerianus	200	11	176	136
Spartina alterniflora	98	10	171	152
Spartina cynosuroides	29	8	87	107
Spartina patens	631	11	349	370
Control (no plant)	—	6	—	—
LSD 0.05	197	7	131	144
LSD 0.01	—	—	172	189

LSD = Least significant difference.

species except *Spartina alterniflora* (Table 30). The maximum crab burrow densities followed the optimum plant growth in the upper zone, but failed to be significantly higher in the middle zone in *Spartina alterniflora* plots. This was partially the result of large portions of the middle zone being occupied by naturally invading *Spartina alterniflora* thus, masking a significant relationship of transplanted *Spartina alterniflora* to crab burrow density. The largest aerial biomass was for *Spartina alterniflora* in the middle zone and largest root biomass was for *Spartina patens* in the upper zone.

128. The propagule types, as measured by the dependent variables, were similar by the end of the experiment (three growing seasons for sprigged, two growing seasons for seeded). Few significant differences were detected. The two most influential treatments were zone (elevation) and species. Differences among species reflected the growth pattern of each species and not necessarily a response to experimental treatments. The crab populations preferred the upper third of the intertidal zone, but were found in the middle zone primarily associated with *Spartina alterniflora*.

Species performance

129. Figures 25 and 26 depict the mean survival of the ten original transplanted sprigs per plot for each species. Survival was determined in November 1975 and expressed over the elevational plane in terms of hours of inundation per day. The hours of inundation reflected the tidal datum from August through November 1975, and therefore represented the tidal inundation experienced by the sprigs.

130. *Spartina alterniflora* was the only species to survive more than 12 hours of tidal inundation per day. Considering the time of transplantation (June 1975) overall survival of individual sprigs was good for all species except *Iva frutescens*, *Juncus roemerianus*, and *Spartina cynosuroides*. The shallow root system of *Iva frutescens* sprigs coupled with the proportionally large aerial portion caused many of the sprigs to be washed out by tidal action. Short, stout sprigs of *Spartina cynosuroides* were difficult to find in late June, consequently larger sprigs (as much as 70 cm in height) and small,

TABLE 30.

MEAN PLANT BIOMASS AND DENSITY, AND CRAB BURROW DENSITY BY SPECIES AND ZONE FOR NOVEMBER 1977

Species	Zone	Stems $/m^2$	Crab Burrow/m^2	Aerial Biomass gdw/m^2	Root Biomass gdw/m^2
Borrichia frutescens	1	0	0	0	0
	2	0	4	0	0
	3	105	23	244	297
Distichlis spicata	1	0	0	0	0
	2	0	3	3	1
	3	742	66	209	225
Iva frutescens	1	0	0	0	0
	2	0	4	2	0
	3	126	28	317	382
Juncus roemerianus	1	0	0	0	0
	2	0	3	11	0
	3	599	30	518	409
Spartina alterniflora	1	78	0	177	141
	2	181	9	288	146
	3	35	22	108	170
Spartina cynosuroides	1	0	0	0	0
	2	8	5	20	20
	3	79	18	241	300
Spartina patens	1	0	0	0	0
	2	0	1	0	0
	3	1894	31	1046	1109
Control (no plant)	1	—	0	—	—
	2	—	7	—	—
	3	—	11	—	—
LSD 0.05		341	11.4	227	249
LSD 0.01		—	—	299	328

LSD = Least significant difference.

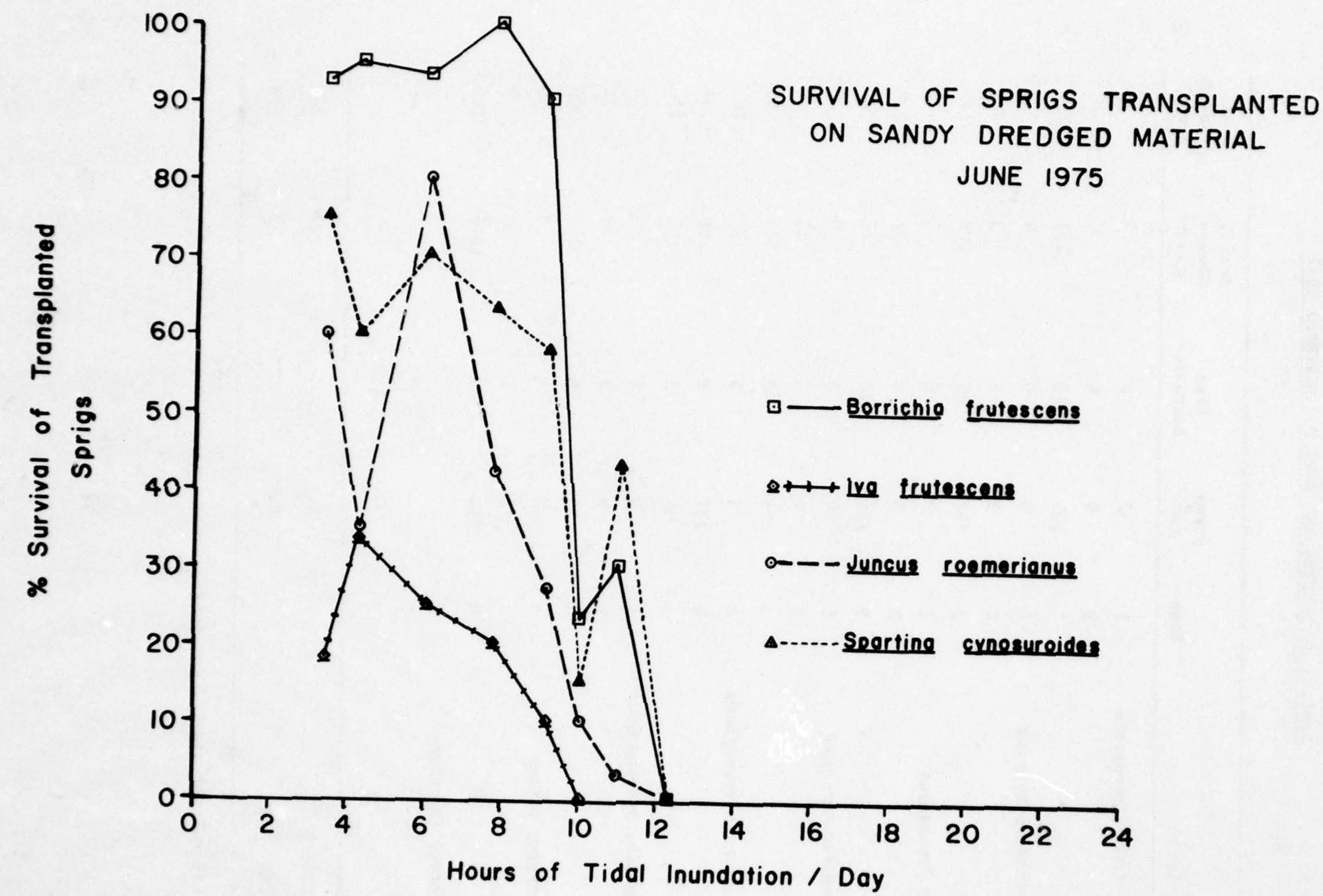

Figure 25. Initial transplant survival after one growing season (June to November 1975).

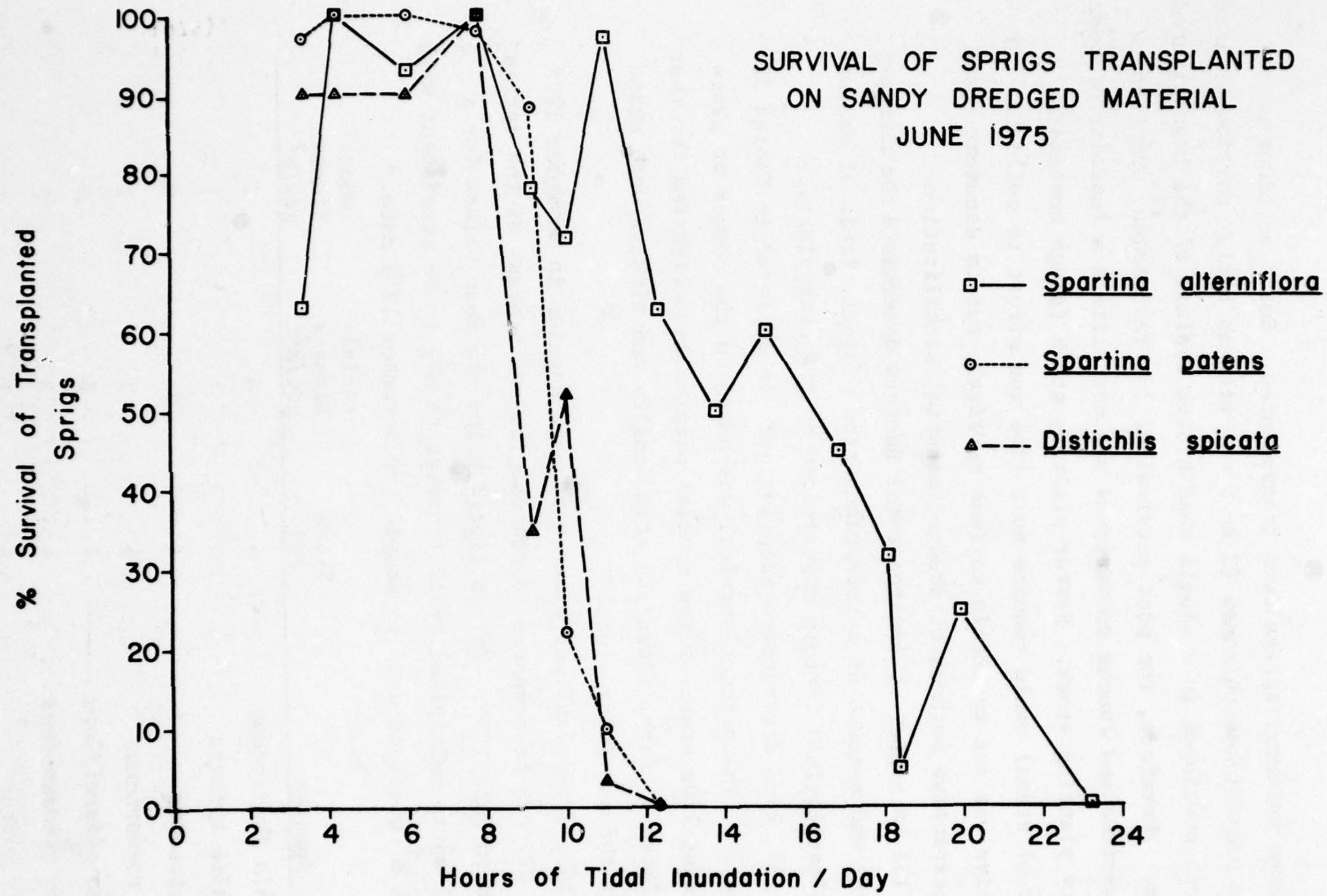

Figure 26. Initial transplant survival after one growing season (June to November 1975).

sometimes spindly, sprigs were transplanted. Small sections of *Juncus roemerianus* rhizomes (3 to 5 cm) with an aerial portion of 1 to 3 leaves enveloped in a single sheath were typical of the transplanted sprigs. Therefore, the poor survival of *Iva frutescens, Spartina cynosuroides* and *Juncus roemerianus* was most likely a function of poor quality planting stock. Better planting stock (plugs containing a number of stems) would require more time and effort to collect. Our objective was not to attain maximum survival, but to document rapid and inexpensive methods of dredged material stabilization.

131. A number of environmental factors determined the ultimate survival and success of a transplantation project. Table 31 depicts the climatological factors experienced by the transplants.

132. Each destructive sampling date is depicted in Tables 32 through 37. The percent survival was based on the number of plots containing live stems of the species originally designated for that plot. Stem density, flowering stem density and biomass were means of only the surviving plots.

133. Transplant performance of each species in November 1975 (Table 32) can be compared to the density and biomass of the sprigs planted in June 1975. Values listed below are mean values for a typical sprig multiplied by 10 (convert to m^2) to be consistent with the 0.1 m^2 quadrats used to sample the November 1975 data.

Species	Stems $/m^2$	Aerial Biomass gdw/m^2	Root Biomass gdw/m^2
Borrichia frutescens	4	4	2
Distichlis spicata	4	1	1
Iva frutescens	4	24	8
Juncus roemerianus	4	1	2
Spartina alterniflora	4	6	5
Spartina cynosuroides	4	3	2
Spartina patens	4	1	1

The largest increase in overall biomass was by *Spartina alterniflora*

Table 31.

Monthly Climatological Data for Buttermilk Sound, Georgia

(From Sapelo Island Weather Station)

	Month	Ave. Daily Temp. °C	Min. Temp. °C	Max. Temp. °C	Days of Rainfall	Total Centimetres Rainfall	No. Days Below 0°C	Degree (C°) Days
	May	24.7	13.3	35.0	6	6.07	0	766
	June	26.7	21.1	35.0	13	7.80	0	801
1	July	26.7	13.3	35.6	9	14.71	0	828
9	August	28.7	21.1	36.7	10	8.41	0	887
7	September	24.6	15.0	35.0	9	6.78	0	738
5	October	22.7	4.4	31.7	6	5.36	0	704
	November	17.2	0.0	30.0	4	0.48	0	516
	December	12.7	-3.9	25.6	9	6.22	5	394
	January	10.9	-3.9	23.9	8	7.82	8	338
	February	14.2	0.0	28.3	2	2.39	0	398
	March	17,9	-3.9	31.7	6	5.99	2	555
	April	20.4	6.7	31.3	5	0.91	0	612
1	May	22.3	9.4	31.7	6	17.91	0	691
9	June	25.1	17.2	30.6	16	18.39	0	753
7	July	28.2	20.6	37.2	7	9.19	0	874
6	August	26.4	18.9	36.1	12	23.98	0	818
	September	25.4	16.1	33.3	13	24.98	0	762
	October	18.7	5.0	30.6	6	7.06	0	580
	November	13.2	-1.7	27.8	9	13.00	2	396
	December	11.2	-3.3	24.4	15	15.49	5	347
	January	7.1	-8.3	20.0	11	11.94	12	220
	February	11.1	-3.3	27.7	5	4.34	8	311
	March	18.2	-0.6	31.7	5	5.66	1	564
1	April	20.8	5.0	32.2	3	4.88	0	624
9	May	24.4	12.2	34.4	7	7.59	0	756
7	June	33.3	17.8	37.8	9	13.36	0	999
7	July	28.9	19.4	37.8	11	9.73	0	986
	August	27.8	21.7	32.8	13	12.04	0	862
	September	26.9	18.3	34.4	14	25.40	0	807

TABLE 32.

SPECIES PERFORMANCE BY HARVEST TECHNIQUES AS OF NOVEMBER 1975

TRANSPLANTED

Intertidal Zone†	Species	Stems /m^2	Aerial Biomass gdw/m^2	Root Biomass gdw/m^2	Flowering Stems/m^2	Percent Survival
3	*Borrichia frutescens*	3	19	16	0	100
	Distichlis spicata	34	23	16	0	100
	Iva frutescens	0.8	97	50	0	67
	Juncus roemerianus	5	5	7	0	87
	Spartina alterniflora	7	20	33	0.4	93
	Spartina cynosuroides	4	15	32	0	93
	Spartina patens	51	95	50	0	100
2	*Borrichia frutescens*	0.7	-	-	0	2
	Distichlis spicata	1	-	-	0	33
	Iva frutescens	0	-	-	0	0
	Juncus roemerianus	0.2	-	-	0	13
	Spartina alterniflora	26	96	191	0.4	80
	Spartina cynosuroides	1	-	-	0	33
	Spartina patens	1	-	-	0	27
1	*Spartina alterniflora*	5	52	143	0	67

† Intertidal Zone
1 = Lower third cf intertidal zone.
2 = Middle third of intertidal zone.
3 = Upper third of intertidal zone.

in the middle zone (Table 32). *Spartina patens* in the upper zone produced the largest increase in stem density. Figure 27 depicts *Spartina patens* one month after transplanting. Except for *Spartina alterniflora* all other species were nearly extinct from the lower two zones. *Spartina alterniflora* had good survival and biomass production in all three zones over this first growing season. *Spartina alterniflora* was the only species to produce seedheads the first year.

134. By June of 1976, surviving plots of all species increased in biomass and stem density (Table 33). The species not listed in Table 33 were not absent, but contained so little vegetation they were not destructively sampled. *Distichlis spicata, Juncus roemerianus* (Figure 28), and *Spartina patens* (Figure 29) showed large increases in stem densities; however, the magnitude of the increases reflected the very dense parent clumps (resulting from the original sprig) and not the density of a homogeneous stand. Nearly all *Spartina alterniflora* plots in the lower intertidal zone had died over winter, but those remaining produced the highest stem densities and biomass for *Spartina alterniflora*.

135. The seeded plots were planted in April 1976 and were first harvested in October 1976. During the interval from planting to the first harvest, several density counts were performed on the plots (Table 34). From Table 34 the number of seeds planted per plot was the total number of seeds and not viable seeds as estimated in the "methods" portion of this section. A combination of low germination percentage and seedling mortality contributed to the low seedling density of July 1976. August and November 1976 density increases were the result of shoot production and rhizome spread from the original seedling. The most prolific seedings were *Distichlis spicata* and *Spartina patens*.

136. The destructive harvest of October 1976 revealed continued biomass increases for the transplanted areas (Table 35). *Distichlis spicata* and *Spartina patens* attained or exceeded aerial biomass and stem density values comparable to the range reported for each species

Figure 27. *Spartina patens* transplants several weeks after planting.

TABLE 33.

SPECIES PERFORMANCE BY HARVEST TECHNIQUES

AS OF JUNE 1976

TRANSPLANTED

Intertidal Zone †	Species	Aerial Biomass gdw/m^2	Root Biomass gdw/m^2	Stems $/m^2$	Percent Survival
	Borrichia frutescens	99	58	54	40
	Distichlis spicata	49	58	415	73
3	*Juncus roemerianus*	69	52	195	27
	Spartina alterniflora	32	56	47	53
	Spartina patens	30	41	6400	87
	Borrichia frutescens	22	112	30	7
2	*Spartina alterniflora*	53	122	84	67
	Spartina patens	3	-	0	7
1	*Spartina alterniflora*	192	956	120	13

† Intertidal Zone
1 = Lower third of intertidal zone.
2 = Middle third of intertidal zone.
3 = Upper third of intertidal zone.

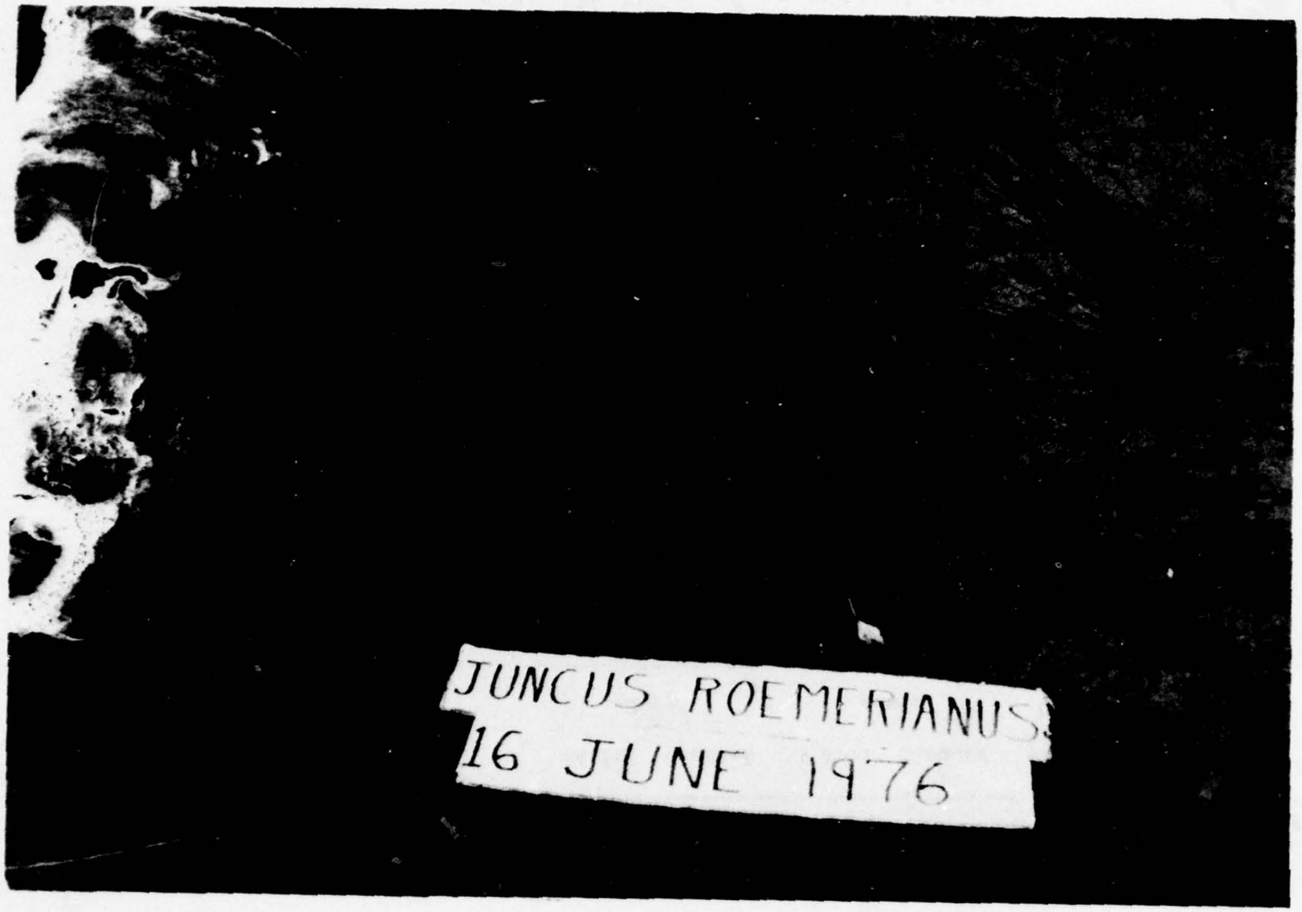

Figure 28. *Juncus roemerianus* one year after transplantation.

Figure 29. *Spartina patens* one year after transplantation.

TABLE 34.

Initial Seedling Response At Buttermilk Sound

Species	Approximate Number of Seeds Planted per m^2	Culm Densities /m^2		
		July 1976	August 1976	November 1976
Borrichia frutescens	1400	15	22	156
Distichlis spicata	400	64	740	2283
Iva frutescens	3800	3	8	8
Juncus roemerianus	4000	0	0	0
Spartina alterniflora	340	22	24	109
Spartina cynosuroides	660	38	38	130
Spartina patens	40	5	5	593

TABLE 35.

SPECIES PERFORMANCES BY HARVEST TECHNIQUES AS OF OCTOBER 1976

Intertidal Zone †	Species	SEEDED Stems /m^2	Aerial Biomass gdw/m^2	Root Biomass gdw/m^2	Flowering Stems/m^2	Percent Survival	TRANSPLANTED Stems /m^2	Aerial Biomass gdw/m^2	Root Biomass gdw/m^2	Flowering Stems/m^2	Percent Survival
	Borrichia frutescens	49	16	6	0	73	56	285	139	3	73
	Distichlis spicata	2284	447	262	0	80	1873	608	308	488	87
	Iva frutescens	5	3	0.7	0	40	2	-	-	-	33
3	*Juncus roemerianus*	0	0	0	0	0	805	161	122	0	60
	Spartina alterniflora	119	40	24	0	67	135	111	119	5	60
	Spartina cynosuroides	130	68	86	0	80	84	178	157	0.6	53
	Spartina patens	593	146	152	0	67	4671	3602	1113	-	67
	Borrichia frutescens	0	0	0	0	0	7	10	7	0	13
	Distichlis spicata	24	13	10	0	7	65	4	3	0	20
2	*Spartina alterniflora*	71	30	17	0	53	123	134	158	3	80
	Spartina cynosuroides	24	10	6	0	6	0	0	0	0	0
	Spartina patens	48	147	163	0	6	14	12	10	0	0
1	*Spartina alterniflora*	0	0	0	0	0	230	220	286	0	13

† Intertidal Zone
1 = Lower third of intertidal zone
2 = Middle third of intertidal zone
3 = Upper third of intertidal zone

from Georgia marshes (Reimold and Linthurst 1977). *Spartina patens* produced the largest aerial and root biomass and stem density per m^2 of any of the experimental species. The first occurrence of flowering stems was recorded for *Borrcihia frutescens*, *Distichlis spicata* and *Spartina cynosuroides*. *Spartina patens* produced a small number of seedheads but could not be accurately quantified using the 0.01 m^2 quadrats. *Spartina alterniflora* continued to perform best in the middle and lower zones (Figure 30).

137. The seeded areas in October 1976 showed *Distichlis spicata* and *Spartina patens* to be the leading biomass producers. In terms of plot survival, *Distichlis spicata* and *Spartina cynosuroides* did well in the upper zone and *Spartina alterniflora* was the only significant survivor in the middle zone. No *Juncus roemerianus* seedlings survived nor did any seeded areas survive in the lower intertidal zone. No flowering stems were recorded for the seeded areas. A comparison of seedling performance from Table 35 and transplant performance after one year (Table 32) revealed greater means for seeded areas for all species except *Iva frutescens*, *Juncus roemerianus*, and *Spartina alterniflora*.

138. The continued dispersion of new shoots from the original transplant or seedling greatly reduced the clumped population structure of many of the plant species. Attenuated density and biomass means for most of the species in May 1977 (Table 36) resulted from this thinning effect. Transplanted *Spartina alterniflora* continued to do best in the middle and lower zones. *Spartina cynosuroides* was the only species other than *Spartina alterniflora* to have seedlings survive in the middle zone. *Distichlis spicata and Spartina patens* produced the greatest mean stem density and root and aerial biomass for both seeded and transplanted propagules in the upper zone. *Juncus roemerianus* exhibited near normal densities of flowering culms (Figure 31).

139. Table 37 depicts species performance for the November 1977 sampling period. Most species both seeded and transplanted attained

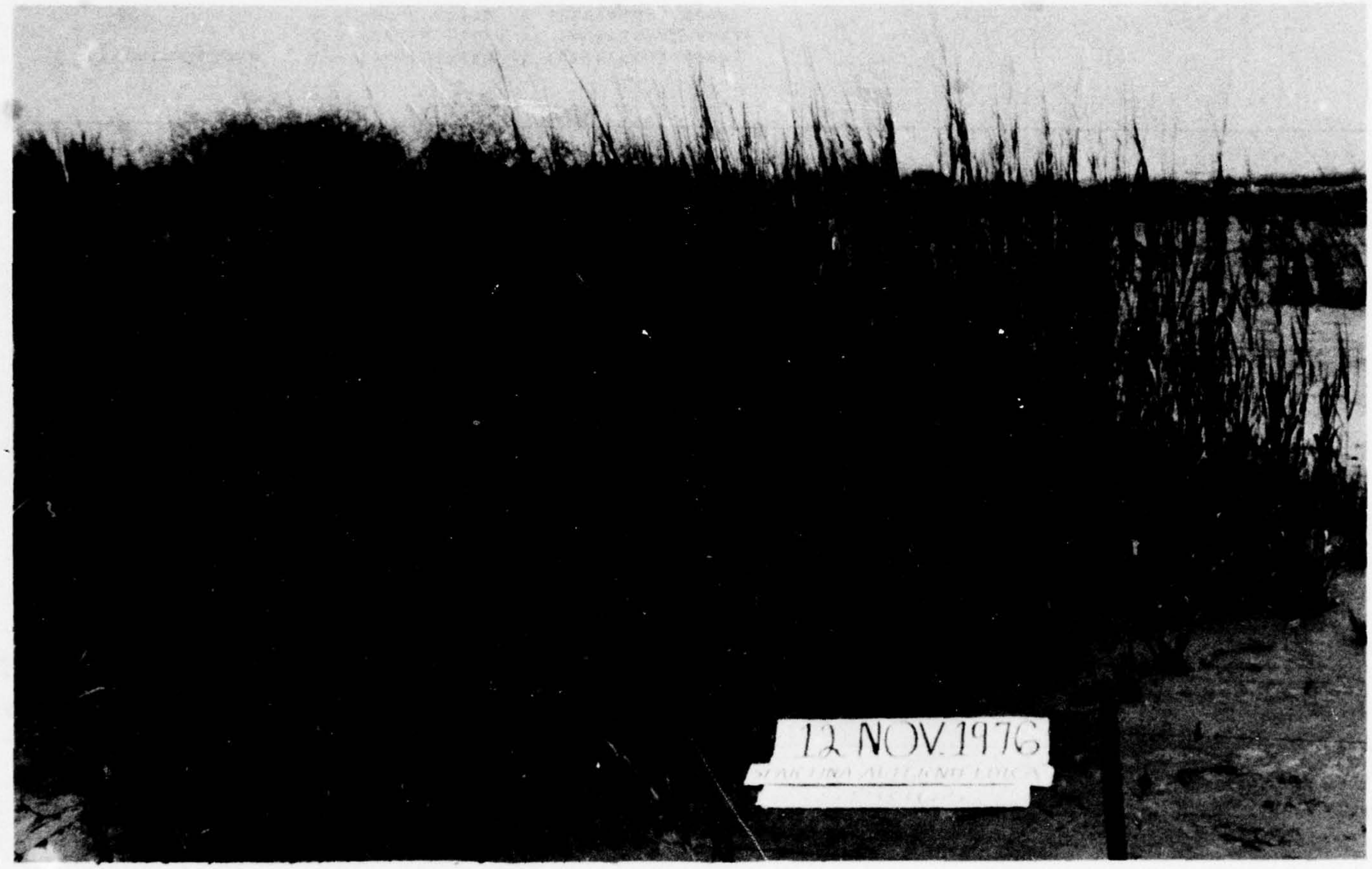

Figure 30. *Spartina alterniflora* in the middle zone, two growing seasons after transplantation.

Table 36. Species Performance By Harvest Techniques as of May 1977

Intertidal Zone †	Species	Transplanted Aerial Biomass gdw/m^2	Transplanted Root Biomass gdw/m^2	Transplanted Stems/m^2	Transplanted Percent Survival	Seeded Aerial Biomass gdw/m^2	Seeded Root Biomass gdw/m^2	Seeded Stems/m^2	Seeded Percent Survival
3	*Borrichia frutescens*	91	58	47	67	35	22	40	33
	Distichlis spicata	245	220	1537	80	157	142	333	53
	Juncus roemerianus	138	108	173	40	46	47	130	7
	Spartina alterniflora	34	120	70	20	10	10	30	13
	Spartina cynosuroides	55	71	35	47	25	26	30	13
	Spartina patens	1625	714	2483	67	484	748	1423	20
2	*Spartina alterniflora*	147	187	74	47	55	29	48	27
	Spartina cynosuroides	100	150	60	7	0	0	0	0
1	*Spartina alterniflora*	129	143	175	20	0	0	0	0

† Intertidal Zone
1 = Lower third of intertidal zone.
2 = Middle third of intertidal zone.
3 = Upper third of intertidal zone.

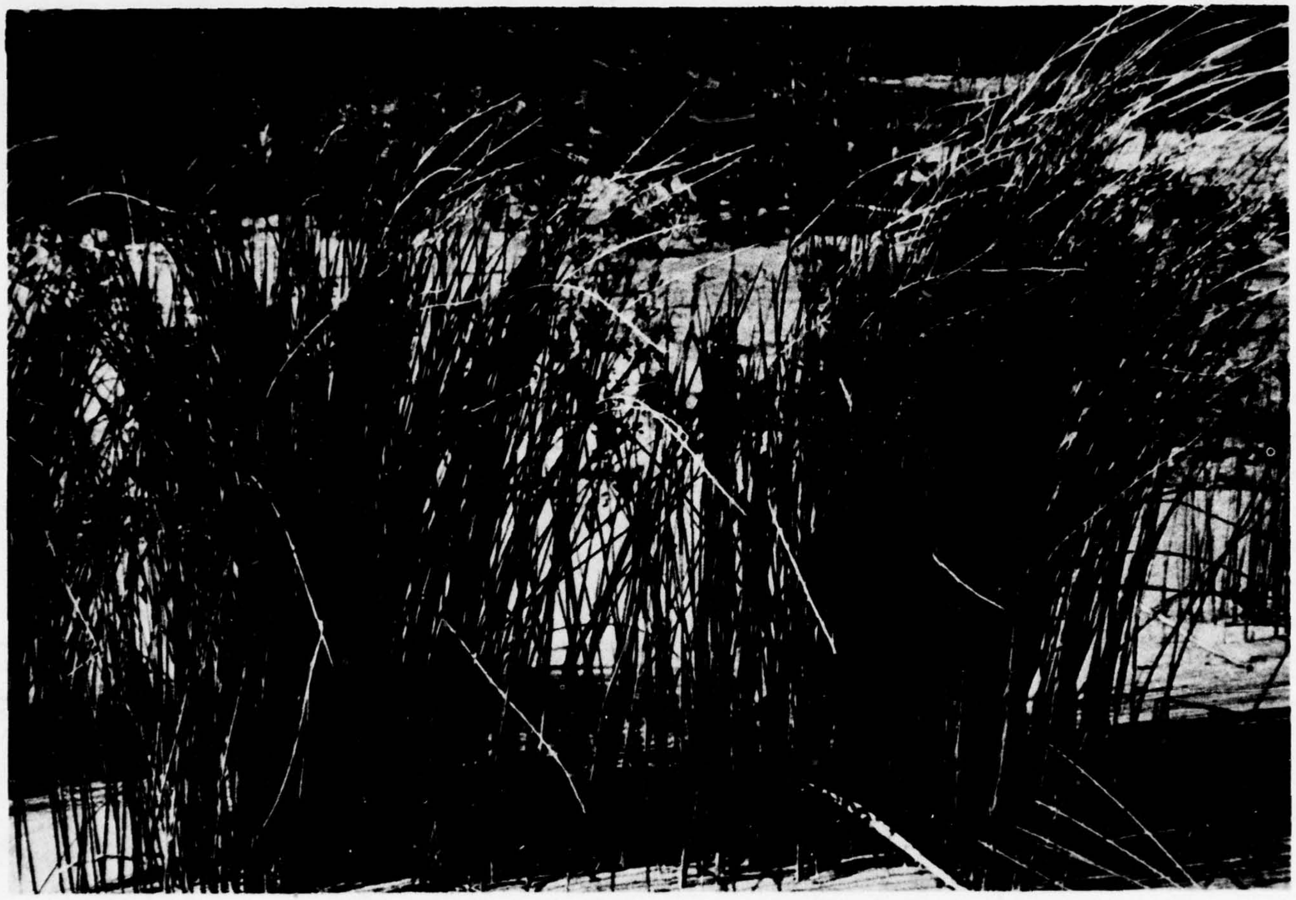

Figure 31. *Juncus roemerianus* transplants in May of 1977.

TABLE 37.

SPECIES PERFORMANCE BY HARVEST TECHNIQUES
AS OF NOVEMBER 1977

		SEEDED AREAS					TRANSPLANTED AREAS				
Intertidal† Zone	Species	Stems $/m^2$	Aerial Biomass gdw/m^2	Root Biomass gdw/m^2	Flowering Stems $/m^2$	Percent Survival	Stem $/m^2$	Aerial Biomass gdw/m^2	Root Biomass gdw/m^2	Flowering Stems $/m^2$	Percent Survival
3	*Borrichia frutescens*	93	357	252	3	67	186	355	527	20	80
	Distichlis spicata	697	186	166	10	80	977	336	422	5	80
	Iva frutescens	103	842	746	80	67	35	481	1350	160	33
	Juncus roemerianus	0	0	0	0	0	1669	1414	1114	217	73
	Spartina alterniflora	154	1197	249	1	40	44	106	126	40	47
	Spartina cynosuroides	145	198	334	11	73	100	505	533	10	67
	Spartina patens	3833	3373	2225	14	46	3372	1330	1682	100	80
2	*Distichlis Spicata*	-	-	-	-	-	37	10	5	0	2
	Iva Frutescens	-	-	-	-	-	25	48	106	0	13
	Spartina alterniflora	160	274	222	12	71	385	337	151	24	87
	Spartina cynosuroides	120	302	293	0	13	-	-	-	-	-
1	*Spartina alterniflora*	-	-	-	-	-	603	569	1292	13	27

† Intertidal Zone
1 = Lower third of intertidal zone.
2 = Middle third of intertidal zone.
3 = Upper third of intertidal zone.

their highest aerial and root biomass on this date (Figure 32). The most substantial increases were noted for the root biomass. Aerial biomass estimates from the upper zone for all but *Spartina patens* (Figure 33) remained lower than estimates for natural marshes in Georgia (Reimold and Linthurst 1977, Gallagher et al. in press). *Borrichia frutescens, Distichlis spicata,* and *Spartina patens* all showed 80 percent survival of transplanted plots in the upper zone. *Spartina alterniflora* had 87 percent of the transplanted plots survive in the middle zone (Figure 34). All of the transplanted species produced flowering stems by November 1977. *Spartina alterniflora* was the major occupant of the middle zone and the sole occupant of the lower zone. The highest root and aerial biomass for *Spartina alterniflora* was recorded in the lower zone.

140. In most cases, seeded plots produced a larger quantity of aerial biomass than the transplanted counterpart, however, the seeded areas failed to equal root biomass production in the transplanted areas. *Spartina cynosuroides* was the only seeded species to produce root biomass in excess of aerial biomass whereas transplanted *Juncus roemerianus* was the only species not to have a greater root biomass than aerial biomass. *Spartina patens* and *Iva frutescens* produced the highest combined root and aerial biomass for seeded plots in the upper zone. Plot survival rates of 80 percent for *Distichlis spicata* and 73 percent for *Spartina cynosuroides* were highest for seeded areas. All surviving species in the upper zone and *Spartina alterniflora* in the middle zone produced flowering stems.

141. A graphic representation of each of the dependent variables for each sampling date for the entire experimental period is found in Appendix D. Graphs illustrating each dependent variable versus elevation is found in Appendix D. A summary of performance for each species is found in Appendix D.

Root to shoot ratio

142. Plant survival following propagation was dependent upon a species ability to build a substantial root mat (Woodhouse et al. 1974).

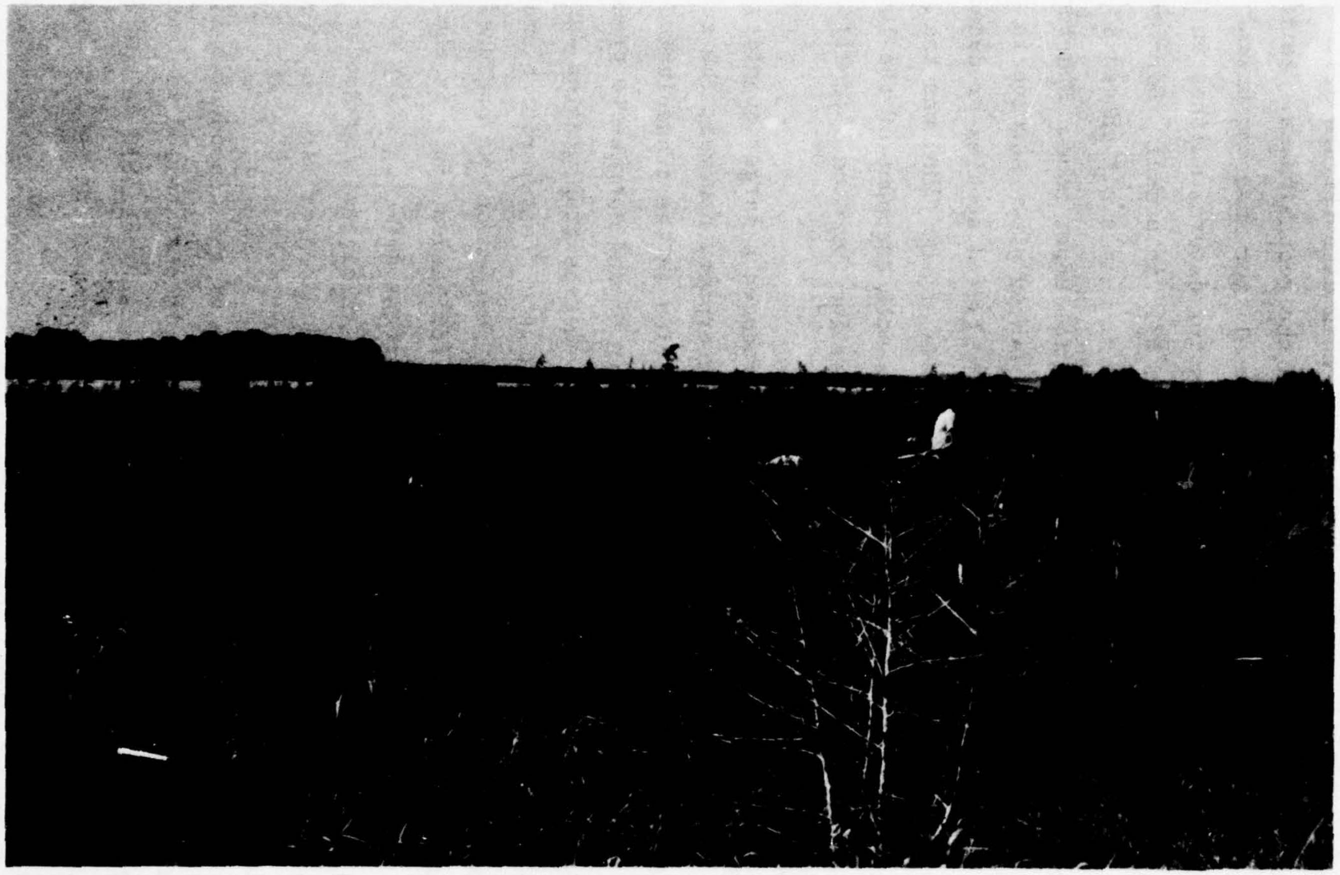

Figure 32. Buttermilk Sound Marsh Habitat Development Site in July 1977. View is south.

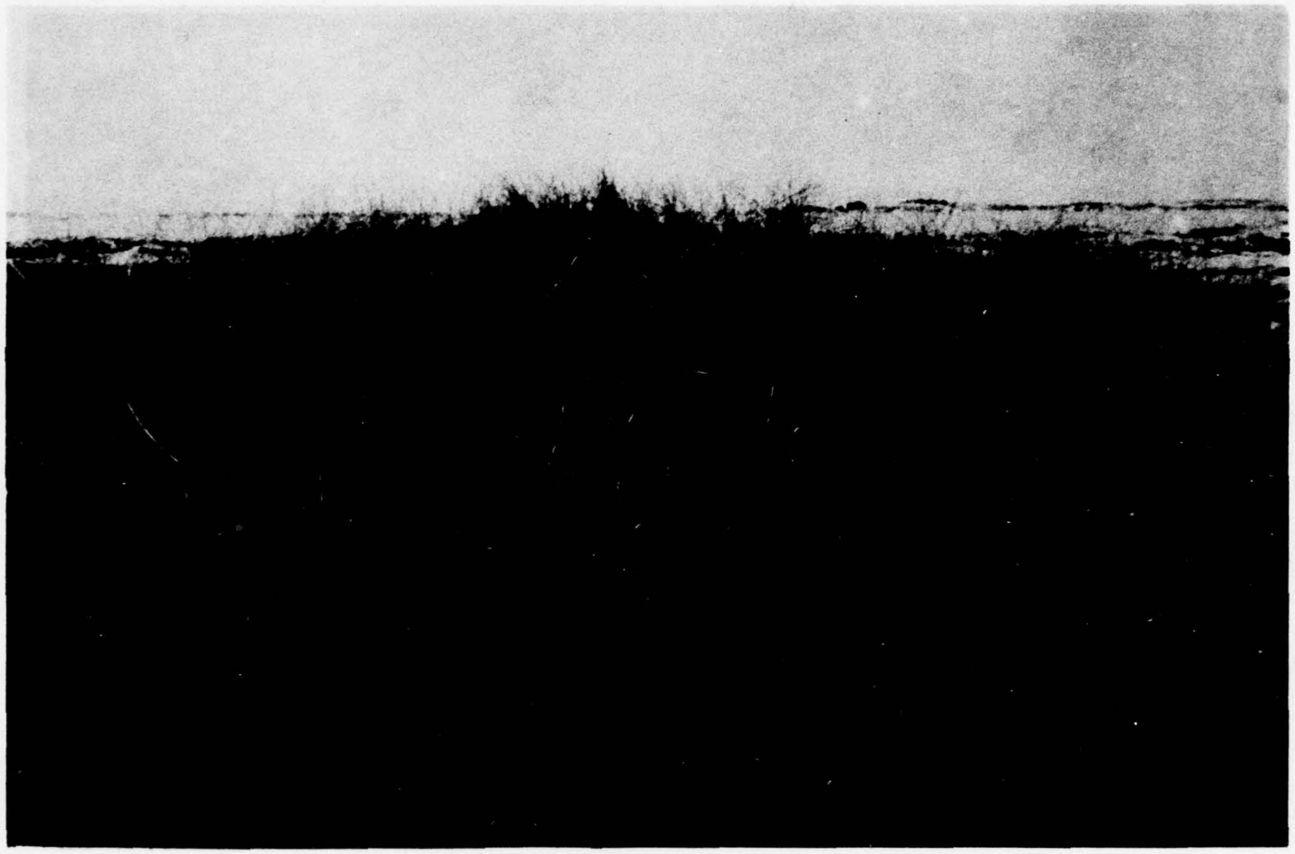

Figure 33. *Spartina patens* transplants November 1977 after three growing seasons.

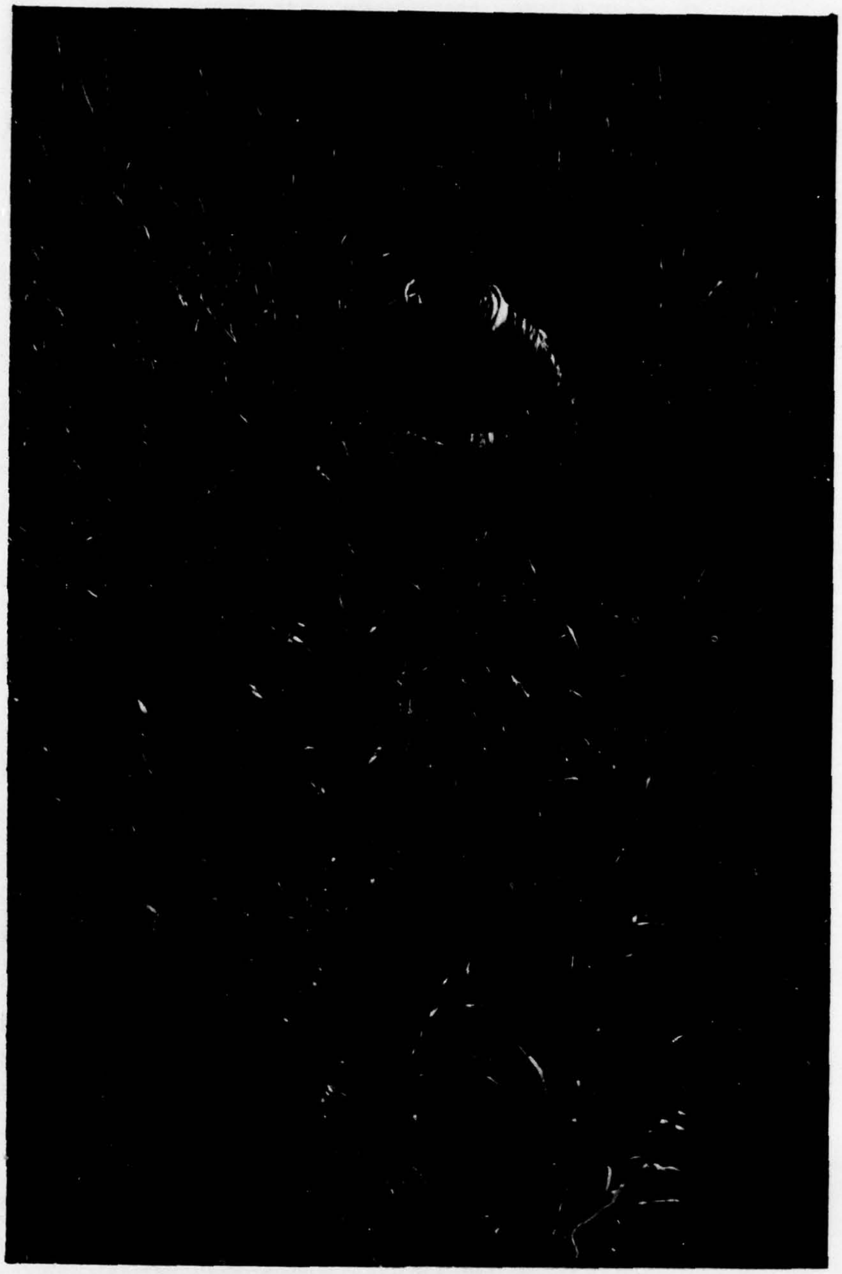

Figure 34. *Spartina alterniflora* transplants in the middle zone November 1977.

The root system served to anchor the plants during stormy winter tides and acted as a storage organ for food to begin growth the following spring. Thus, the development of a substantial root system was essential for survival of a newly planted marsh.

143. An indicator of the progress of a plant stand toward a mature and stable condition was the root to shoot ratio. The ratio was equal to the root biomass/m^2 divided by aerial biomass/m^2. The root to shoot ratio provided a relative index for monitoring the maturation of the plant stand. Biomass measurements were dependent upon placement of the sample quadrat around a representative portion of the plant stand. The root to shoot ratio was also dependent on proper placement; however, was affected to a lesser degree by an improper sample. Therefore, the root to shoot ratio represented a more reliable measure of the relative composition of a particular plant stand.

144. The mean root to shoot ratios for each species and propagule type are found in Table 38. Transplanted *Borrichia frutescens* and *Distichlis spicata* maintained a relatively constant root to shoot ratio over the experimental period. A slight reduction in root to shoot ratios were evident in the spring and slight increases seen during the fall for both species. *Iva frutescens* experienced variation in ratio values with the highs coming during the fall intervals when leaf senescence and abscission had already begun. Transplanted *Juncus roemerianus* reached a maximum root to shoot ratio in May 1977 with a value of 1.73 and a decrease in November of 1977 to 0.94. Accumulated aerial growth from the growing season may have diluted the November 1977 value. *Spartina alterniflora* and *Spartina cynosuroides* maintained a steady increase of root to shoot ratios throughout the duration of the project. *Spartina alterniflora* reached a ratio of 1.20 and *Spartina cynosuroides* had a ratio of 2.30 by November 1977. *Spartina patens* followed an inverse pattern as compared to the other *Spartinas* in that the root to shoot ratios steadily decreased with time. This trend was the result of a very clumped population structure during early development which gave way to a more even distribution as the population matured.

TABLE 38.

Mean Root to Shoot Ratio* for Buttermilk Sound Experimental Species by Propagule Type

Species	November 1975	June 1976	October 1976	May 1977	November 1977
TRANSPLANTED					
Borrichia frutescens	1.44 ± 0.15 †	1.67 ± 1.25	1.72 ± 0.23	1.40 ± 0.23	1.77 ± 0.59
Distichlis spicata	1.68 ± 0.30	1.50 ± 0.40	1.87 ± 0.29	1.37 ± 0.21	1.80 ± 2.13
Iva frutescens	1.77 ± 0.38	------------	4.27 ± 0.00	0.43 ± 0.01	1.94 ± 1.01
Juncus roemerianus	1.06 ± 0.34	0.98 ± 0.00	1.22 ± 0.10	1.73 ± 0.40	0.94 ± 0.28
Spartina alterniflora	0.60 ± 0.06	0.74 ± 0.22	0.92 ± 0.08	1.13 ± 0.15	1.20 ± 0.24
Spartina cynosuroides	0.49 ± 0.06	------------	0.67 ± 0.10	1.32 ± 0.58	2.30 ± 0.71
Spartina patens	3.42 ± 0.71	------------	3.25 ± 0.84	2.15 ± 0.24	1.64 ± 0.47
SEEDED					
Borrichia frutescens			2.63 ± 1.11	1.44 ± 0.34	0.88 ± 0.42
Distichlis spicata			2.08 ± 0.35	1.14 ± 0.18	0.96 ± 0.11
Iva frutescens			3.93 ± 0.64	0.79 ± 0.19	2.37 ± 0.97
Juncus roemerianus			-----------	-----------	-----------
Spartina alterniflora			2.19 ± 0.72	0.92 ± 0.08	3.51 ± 1.33
Spartina cynosuroides			2.09 ± 0.45	1.07 ± 0.09	1.51 ± 1.18
Spartina patens			2.84 ± 0.96	1.44 ± 0.78	1.04 ± 0.35

*Root to shoot ratios = $\frac{\text{root biomass gdw/m}^2}{\text{aerial biomass gdw/m}^2}$ for each plot sampled.

†Mean ± standard deviation.

145. The seeded areas all possessed a much higher ratio in October 1976 than their transplanted counterparts had in November 1975 (after one growing season). The transplanted areas dispersed from the original sprigs much more than the seeded areas during the first growing season thereby reducing the clumped effect. Also the seeded areas were planted at a higher density than transplanted areas thus increasing the number of clumps harvested within the sample quadrats.

146. Seeded areas of *Borrichia frutescens* and *Distichlis spicata* showed declining root to shoot ratios over the three sampling intervals. Ratios exhibited by both species in November 1977 were about half of transplanted areas of each species. Seeded *Iva frutescens* had root to shoot ratios comparable to transplanted areas and duplicated a reduction in the ratio of transplanted areas in May 1977. *Spartina alterniflora* and *Spartina cynosuroides* maintained higher ratios for a comparable time period than transplanted areas. *Spartina patens* seeded areas followed a similar pattern of declining root to shoot ratios with time to that of transplanted areas. Root to shoot ratios also helped to delineate optimum growth ranges for each species within the intertidal zone. Graphs of each plant species for each of the destructive sampling dates is found in Appendix E.

147. Based on root to shoot ratios more stable plant communities developed for *Borrichia frutescens* and *Distichlis spicata* from transplanted sprigs. *Iva frutescens* and *Spartina cynosuroides* produced highest root to shoot ratios from seeded stock. *Spartina patens* performed about the same from either propagule type and *Juncus roemerianus* only survived from transplanted stock. *Spartina alterniflora* appeared to perform best from seeds; however, inspection of biomass values and culm density indicated the lower root to shoot ratios of transplanted areas to be a more healthy value for this species.

Integrated biomass

148. In April 1977, the area of each monospecific plant stand originating from either sprigged or seeded plots was determined. Plots estimated to have 1.0 m^2 or less vegetative cover were not measured. *Iva frutescens*, *Juncus roemerianus* and seeded *Spartina patens*

occupied small, discontinuous areas and therefore, were not measured. The area in square metres occupied by each of the species measured is listed below:

Species	Transplanted (m^2)	Seeded (m^2)
Borrichia frutescens	70.2	3.4
Distichlis spicata	163.0	65.5
Spartina alterniflora	198.8	5.0
Spartina cynosuroides	9.0	2.4
Spartina patens	193.8	---

Many of the seeded areas had not spread sufficiently to warrent measuring. The integrated biomass was calculated for each plot by the following equation:

$$\frac{\text{Area of plot m}^2}{\text{Total vegetated area of site m}^2} \text{ X Biomass of plot gdw/m}^2 = \text{Integrated biomass gdw/m}^2$$

The November 1977 biomass data were used in the calculations. The area occupied by each species was greater by November 1977 than had been in April 1977; however, the relative proportions of each species probably changed a little. The greatest area change would have occured in the seeded plots.

149. The derivation of integrated biomass provided a measure of species biomass proportional to the total area occupied by all species. Biomass measurements were species dependent and provided a measure of performance for each plant stand. Biomass provided sound comparisons of performance among plant stands of the same species, but interspecific comparisons were harder to interpret. By expressing biomass as an integrated measure of both biomass and area, interspecific comparisons and intraspecific comparisons were based on a common denominator, therfore, more representative of overall performance and importance. Integrated biomass was used as an index of relative importance and was not meant to be a quantitative measure of aerial and root biomass.

150. The mean integrated root and aerial biomass for each species and propagule type is found in Table 39. *Spartina patens* was the best

TABLE 39.

Mean Integrated Biomass for Buttermilk Sound Experimental Species November 1977

Species	Propagule	Aerial Biomass g/m^2	Root Biomass g/m^2
Borrichia frutescens	sprig	6.7 ± 1.4§	12.2 ± 5.0
	seed	0.8 ± 0.1	0.4 ± 0.2
Distichlis spicata	sprig	6.2 ± 2.4	15.6 ± 8.7
	seed	3.5 ± 1.1	2.9 ± 0.7
Spartina alterniflora	sprig	11.7 ± 3.2	6.4 ± 1.8
	seed	0.1 ± 0.1	0.4 ± 0.4
Spartina cynosuroides	sprig	1.3 ± 0.4	3.0 ± 1.4
	seed	1.6 ± 0	3.4 ± 0
Spartina patens	sprig	41.4 ± 11.7	66.2 ± 28.9
	seed	— —	— —

§ mean ±standard deviation

overall transplanted species producing larger quantities of root and aerial biomass per unit area than any other species. *Spartina alterniflora* produced the second best aerial biomass with *Borrichia frutescens* third. *Spartina cynosuroides* yielded substantial quantities of biomass per square metre; however, when considering the area occupied, the importance of *Spartina cynosuroides* in overall biomass production was greatly reduced. Root production for transplanted areas ranked *Distichlis spicata, Borrichia frutescens, Spartina alterniflora* and *Spartina cynosuroides* behind *Spartina patens*. The high root production per square metre of *Spartina patens, Distichlis spicata* and *Borrichia frutescens* suggested these species to be best suited for substrate stabilization. Graphs of integrated biomass versus the elevational gradient (Appendix E) indicated that these three species occupied primarily the upper zone. Therefore, *Spartina alterniflora*, although somewhat lower in root biomass became very important in areas lower in the intertidal zone. The graphs in Appendix E illustrated the relative importance of each species at different levels in the intertidal zone.

151. The small percentage of the total area occupied by the seeded areas was evident in the low integrated biomass values for all species. *Distichlis spicata* and *Spartina cynosuroides* were the most productive species in both root and aerial biomass for seeded areas. The large difference between integrated biomass values for seeded and transplanted areas more accurately described the performance of propagule types.

152. In most cases, estimates of root and aerial biomass for seeded areas closely approximated transplanted areas. The lopsided division between propagule type was affected by the time of response available to each, suggesting the actual difference would be less if equal time had been available to each propagule type. An estimate of the actual rate of spread for each species and propagule type was derived. Using the number of surviving plots and using the initial planted area of each plot of one square metre the rate of spread per year for each plot was estimated as shown on the next page:

Species	Transplanted m^2/year	Seeded m^2/year
Borrichia frutescens	3.8	0.6
Distichlis spicata	9.0	10.8
Spartina alterniflora	5.5	1.5
Spartina cynosuroides	0.7	0.3
Spartina patens	10.8	---

The values represented the average rate of spread per year for each surviving plot. The rates indicated *Spartina patens* (transplanted), *Distichlis spicata* (transplanted and seeded) and *Spartina alterniflora* (transplanted) to be the most rapidly spreading species. The rate of dispersion of a plant population from a propagule was important for the rapid stabilization of dredged material.

Correlation among dependent variables

153. The dependent variables were used as estimators of plant response to the treatments contained in the experimental design (independent variables). Many of these variables were most useful as a response measure in a specific period of development of the plant stands. Thus, each dependent variable covered a different period of the experiment and possessed different sampling intervals (Table 8). Elevation, a measure of physical environment, and crab burrow density, a measure of crab activity, constituted the only dependent variables not directly measuring a plant parameter.

154. Each simple correlation coefficient (r) was a measure of the degree of closeness of the linear relationship between the two variables being tested. Sampling from the experimental populations, coupled with inherent sampling method error for each variable, may yield a non-normal distribution of data and in turn distort the frequency distribution of "r" to a marked degree. A correlation between two variables was sometimes due to their common relation to other variables. Such problems cannot easily be measured, but will be pointed out if known inconsistancies exist. An "r" value of 0.7 indicated that approximately 50 percent of the variance of one variable was attributed to the second variable. Discussion of significant

relationships will focus on "r" values greater than 0.7 unless, of course, a relationship is sufficiently negative (Snedecor and Cochran 1967).

155. Correlation matrices were performed using all data collected during the 2½ year period of the project. Generally high confidence levels suggested most interactions had a linear relationship with a non-zero slope. A high significance level for so many interactions may have been the result of dependent variables from identical groups (species and zone) being different measurements of the same population. A correlation matrix of the dependent variables was performed on a number of different groupings of data (Appendix F). Table 40 considered zone and zone x species groupings of the data. The data groupings presented, helped to illustrate relationships within the optimum intertidal range of each species.

156. The first series of correlations involved stem density (vertically on Table 40), a measurement performed throughout the experiment, for each data group (horizontally on Table 40). The data groupings were the lower third of intertidal zone by *Spartina alterniflora*, the middle third of intertidal zone by species, the upper third of intertidal zone by each species and each species combining the three zones. Correlations between stem density and crab burrow density was highly significant for all species considered over the entire elevational gradient. The general linear model for crab burrow density from this section, described several significant relationships involving species and zones. The significant correlation coefficients reinforced the relationships described in the model. Although highly significant, the low "r" values indicated that the relationships of stem density to crab burrow density was not a close linear fit.

157. The next correlation involved the elevation of individual plots and stem density. It was interesting to note the highly significant relationship of elevation to stem density within each intertidal zone. This indicated that significant differences in stem densities may have existed for a species within a single intertidal zone.

158. *Iva frutescens* was the only species not having a significant

Table 40.

Summary of Simple Correlation Coefficients for Dependent Variables

Variables of Interaction	Zone 1	Zone 2							Zone 3							Zone 1 & 2 & 3						
Species →	5	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Stem density × Crab burrow density	.21§	.11$^{\Psi}$	.13$^{\Psi}$	.09	.22§	.18§	.18§	.02	.20§	.30§	.24§	.21§	.13$^{\Psi}$	.07	.27§	.20§	.33§	.22§	.20§	.12§	.09†	.31§
Stem density × Elevation	.38§	.65§	.25§	.18§	.18§	.24§	.21§	.14$^{\Psi}$	.17†	.40§	.11$^{\Psi}$	.20§	.23§	.16§	.34§	.23§	.48§	.15§	.24§	.17§	.20§	.39§
Stem density × Average shoot height	.55§	.92§	.71§	1.0§	.76§	.45§	.53§	.84§	.23†	.59§	.09	.27§	.33§	.25§	.46§	.25§	.56§	.10$^{\Psi}$	.27§	.43§	.28§	.46§
Stem density × Flowering stem density	.69§	.02	.01	.00	.00	.55§	.00	.00	.05	.18$^{\Psi}$	.32§	.06	.15*	.00	.00	.07*	.20§	.32§	.08	.58§	.02	.00
Stem density × Root biomass	.99§	.29†	.19*	1.0	.00	.51§	.70§	1.0	.84§	.69§	.66§	.38§	.03	.13	.74§	.84§	.77§	.67§	.40§	.24§	.22§	.77§
Stem density × Aerial Biomass	.72§	.56§	.20*	1.0	.00	.47§	.76§	1.0	.65§	.65§	.24$^{\Psi}$	.63§	.29$^{\Psi}$	.27$^{\Psi}$	.52§	.68§	.73§	.26§	.65§	.56§	.34§	.57§
Stem density × Basal area	.37§	.71§	.44§	1.0	.87§	.27†	.58§	.31§	.13	.49§	.02	.27†	.28†	.23$^{\Psi}$	.36§	.18§	.43§	.04	.26§	.30§	.28§	.40§
Crab burrow density × Elevation	.16†	.27§	.32§	.28§	.32§	.28§	.31§	.28§	.24§	.24§	.29§	.22§	.23§	.24§	.22§	.28§	.32§	.32§	.29§	.27§	.30§	.28§
Crab burrow density × Root biomass	.00	.27$^{\Psi}$	.09	.01	.00	.38§	.02	.02	.55§	.32†	.54§	.31†	.02	.20*	.47§	.56§	.42§	.53§	.33§	.24§	.22§	.77§

Zone: 1 = Lower third of intertidal zone, 2 = Middle third of intertidal zone, 3 = Upper third of intertidal zone; Species: 1 = *Borrichia frutescens*, 2 = *Distichlis spicata*, 3 = *Iva frutescens*, 4 = *Juncus roemerianus*, 5 = *Spartina alterniflora*, 6 = *Spartina cynosuroides*, 7 = *Spartina patens*; Significance level: § = .0001, † = .001, Ψ = .01, * = .05, no symbol = no significance

Table 40.

(Continued)

Variables of Interaction	Zone 1	Zone 2							Zone 3							Zone 1 & 2 & 3						
Species →	5	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Crab burrow density x Aerial biomass	.00	.25¥	.04	.01	.00	.49§	.02	.02	.41§	.22	.28	.67§	.28¥	.08	.71§	.44§	.34§	.28§	.67§	.13¥	.14¥	.72§
Crab burrow density x Basal area	.00	.47§	.08	.00	.01	.21¥	.20¥	.17*	.25¥	.14	.03	.13	.18*	.26†	.11	.16†	.14†	.01	.13¥	.20§	.16§	.14¥
Elevation x Condition	.88§	.33§	.51§	.25§	.38§	.79§	.44§	.41§	.61§	.79§	.39§	.43§	.54§	.55§	.67§	.64§	.78§	.43§	.49§	.61§	.50§	.68§
Elevation x Average shoot height	.85§	.39§	.63§	.17¥	.35§	.74§	.60§	.51§	.61§	.80§	.49§	.63§	.63§	.66§	.70§	.67§	.81§	.52§	.67§	.64§	.73§	.74§
Elevation x Flowering stem density	.22†	.08	.10	.00	.00	.10	.00	.00	.05	.06	.03	.09	.07	.06	.00	.08*	.10¥	.05	.12¥	.05	.09*	.00
Elevation x Survival	.78§	.88§	.74§	.60§	.75§	.44§	.76§	.74§	.58§	.70§	.82§	.74§	.78§	.62§	.66§	.69§	.72§	.84§	.77§	.39§	.69§	.69§
Elevation x Root Biomass	.64§	.14	.30†	.16	.00	.47§	.29	.18*	.21*	.40§	.17	.22¥	.08	.35†	.35§	.33§	.54§	.22§	.27§	.15¥	.45§	.43§
Elevation x Aerial biomass	.85§	.15	.23†	.16	.00	.48§	.28¥	.18*	.28¥	.44§	.14	.25*	.23¥	.27¥	.36§	.42§	.59§	.18†	.30§	.20†	.39§	.43§
Elevation x Basal area	.84§	.37§	.46§	.23¥	.29§	.63§	.51§	.25†	.64§	.76§	.43§	.60§	.59§	.66§	.59§	.71§	.69§	.47§	.61§	.62§	.72§	.65§

Zone: 1 = Lower third of intertidal zone, 2 = Middle third of intertidal zone, 3 = Upper third of intertidal zone; Species: 1 = *Borrichia frutescens*, 2 = *Distichlis spicata*, 3 = *Iva frutescens*, 4 = *Juncus roemerianus*, 5 = *Spartina alterniflora*, 6 = *Spartina cynosuroides*, 7 = *Spartina patens*; Significance: § = .0001, † = .001, ¥ = .01, * = .05, no symbol = no significance

Table 40.

(Continued)

Variables of Interaction	Zone 1	Zone 2							Zone 3							Zone 1 & 2 & 3						
Species →	5	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Condition × Survival	.71§	.98§	.66§	1.0	.88§	.50§	.88§	.60§	.56§	.67§	.90§	.60§	.76§	.47§	1.0§	.69§	72§	.92§	.71§	.50§	.60§	.67§
Average shoot height × Root biomass	.99§	1.0	.84§	.00	.00	.74§	.83§	1.0	.61§	.69§	.86§	.61§	.16	.66§	.65§	.68§	.72§	.58§	.63§	.17$^{\blacktriangledown}$	.69§	.68§
Average shoot height × Aerial biomass	.95§	1.0	.82§	1.0	.00	.61§	.96§	1.0§	.71§	.62§	.91§	.64§	.71§	.63§	.82§	.77§	.68§	.78§	.65§	.72§	.65§	.83§
Average shoot height × Basal Area	.88§	.83§	.85§	1.0	.83§	.76§	.86§	.91§	.81§	.79§	.78§	.89§	.81§	.88§	.77§	.85§	.83§	.80§	.88§	.81§	.90§	.80§
Flowering stem density × Root biomass	.95§	1.0	.43§	.00	.00	.24*	.00	.00	.07	.27$^{\blacktriangledown}$	.06	.01	.02	.18	.00	.11	.29§	.07	.00	.17$^{\blacktriangledown}$	.21§	.00
Flowering stem density × Aerial biomass	.77§	1.0	.16	.00	.00	.34†	.00	.00	.02	.22*	.33†	.01	.29$^{\blacktriangledown}$	.31†	.00	.07	.26§	.34§	.01	.40§	.33§	.00
Root biomass × Aerial biomass	.78§	.96§	.82§	1.0	.00	.76§	.99§	1.0	.73§	.67§	.38§	.76§	.79§	.47§	.57§	.76§	.61§	.61§	.86§	.63§	.78§	.69§
Root biomass × Basal Area	.96§	1.0	.98§	1.0	.00	.64§	.90§	1.0	.64§	.68§	.15	.85§	.48§	.75§	.66§	.68§	.61§	.61§	.86§	.63§	.78§	.69§
Aerial biomass × Basal Area	.91§	1.0	.86§	1.0	.00	.58§	.99§	1.0§	.74§	.67§	.12	.78§	.65§	.69§	.82§	.76§	.61§	.53§	.79§	.66§	.71§	.84§

Zone: 1 = Lower third of intertidal zone, 2 = Middle third of intertidal zone, 3 = Upper third of intertidal zone; Species: 1 = *Borrichia frutescens*, 2 = *Distichlis spicata*, 3 = *Iva frutescens*, 4 *Juncus roemerianus*, 5 = *Spartina alterniflora*, 6 = *Spartina cynosuroides*, 7 = *Spartina patens*; Significance: § = .0001, † = .001, ▼ =.01, * = .05, no symbol = no signficance

correlation between shoot height and stem density. The shrub growth form of *Iva frutescens* accounted for the lack of correlation. Significant relationship between stem density and flowering stems for *Spartina alterniflora* was evident in the lower and middle zones, with *Distichlis spicata* showing a significant relationship in the upper zone. The relationship of root biomass to stem density and aerial biomass to stem density expressed significant correlation coefficients for all species grouped over the entire elevational gradient. Significant correlation for species for each of the intertidal zones described the preferred elevational range of each species. The high "r" values for many species suggested a real association existed. This was not too surprising since biomass can be a function of stem density.

159. The next group of relationships tested the correlation between crab burrow density and each of the measured plant parameters. The coexistence of crabs and plants in a natural marsh suggested the possibility of an ecological, mutually beneficial, relationship between the two (Kraeuter and Wolf 1974). The variables measure two different populations; thus, a positive correlation would indicate mutual growth. Crab burrow density produced significant correlation coefficients with elevation, root biomass and aerial biomass for all species considered over the entire elevational gradient. The relationship of elevation to crab burrow density was also highly significant for each species within each zone. Root and aerial biomass for each plant species expressed significant correlation coefficients with crab burrow density by intertidal zones. Significant correlation coefficients for biomass and crab burrow density were in zones where each plant species performed best, illustrating the association between vegetation and crab activity.

160. Adams (1963) found elevation or inundation time to be a major factor in determining marsh plant zonation. Reimold and Linthurst (1977) described elevational frequency distributions for a number of marsh plants in Georgia, Delaware, and Maine. From the frequency distributions each species prossessed a unique elevational distribution within which it could successfully outcompete other marsh halophytes.

Some of the distributions overlapped representing ecotonal areas, but a composite of all species provided a stepwise gradient of the entire intertidal zone by optimum elevational range for each species. Evidence such as this documented the importance of elevation (duration of tidal inundation) in determining plant distribution and subsequent plant health at each elevation. The plant growth parameters served as indicators of plant health, and thereby, were expected to be closely correlated with elevation.

161. All species grouped over the entire elevational gradient and grouped by each zone expressed significant correlations with elevation by plant condition and average shoot height. Density of flowering culms showed a few significant correlations with elevation, however, low "r" values suggested high variability of the relationship. Every grouping and species had significant correlation coefficients when testing survival with elevation. Survival was a short-lived variable used for measuring transplant survival, primarily during the first summer after planting. The numerous significant correlation coefficients indicated the importance of the abiotic factors represented and/or related to elevation in determining transplant success. Root and aerial biomass showed a species dependent relationship to elevation. Biomass expressed significant correlation coefficients for all species over the entire area and for most species within each zone. Correlation coefficients for basal area and elevation were significant in each data grouping and for each species. Significant correlation coefficients between the plant parameters and elevation within zones indicated a keener response of the plants to elevation than was measured by the blocking of elevation into zones.

162. A test of the relationship between plant condition and plant survival provided significant correlation coefficients and high "r" values which substantiate the accuracy of the plant condition index as an indicator of survival. The relationship of root and aerial biomass to shoot height produced significant correlation coefficients, illustrating the dependence of biomass on height and a concurrent

increase in belowground matter. *Spartina alterniflora* was the only species to have a low "r" value between shoot height and root biomass in the upper intertidal zone. The final relationship involving shoot height was with basal area. All correlation coefficients were significant suggesting a relationship that was not species specific, but generally applies to all species. Elements common to both shoot height and basal area included testing changes of individual culm morphology over time. This suggested either to be an indicator of individual culm performance.

163. The density of flowering culms correlated with root and aerial biomass yielded a significant relationship for *Spartina alterniflora* in the lower intertidal zone. The *Spartina alterniflora* in this zone was actively colonizing bare areas throughout the duration of the project. The newly vegetated areas tended to have higher seedhead densities which correlated well with the increases in root and aerial biomass.

164. Comparisons of root to aerial biomass produced significant correlation coefficients for all species over the entire area and in the upper zone,and for only the surviving species in the lower and middle zones. Comparisons of root and aerial biomass to basal area produced many significant correlations.

165. The correlation coefficients of the dependent variables has shown significant trends in plant growth patterns, similarities of different plant growth measurements and insight into the effect of the physical environment upon each species. Graphical representation of the dependent variables discussed in this section versus time and elevation, can be found in Appendix D.

Summary

166. From the analysis of variance the treatments of species, zone, and species x zone were significant for nearly every dependent variable tested. *Spartina alterniflora* was the only species to

perform well outside of the upper zone. Crab colonization followed the plant colonization demonstrating the necessity of a vegetative cover to encourage crab colonization. *Spartina patens, Distichlis spicata* and *Juncus roemerianus* attained the highest stem densities and crab burrow densities. Each year of the experiment yielded significant increases in both stem and crab burrow densities. Crab colonization was greatest for the upper intertidal zone.

167. Transplanted and seeded areas responded to the same treatments (zone, species, species x zone). Aerial and root biomass means were somewhat higher for transplanted areas than for seeded areas, but the difference was the result of transplanted areas having an extra growing season to manifest a response. Fertilizer treatment had no effect upon transplanted or seeded areas. The most productive species in terms of aerial and root biomass for transplanted areas were *Spartina patens, Distichlis spicata, Juncus roemerianus,* and *Borrichia frutescens* in the upper zone and *Spartina alterniflora* in the middle and lower zones. The most productive seeded species were *Spartina patens, Iva frutescens,* and *Distichlis spicata* in the upper zone and *Spartina alterniflora* in the middle zone.

168. The November 1977 sampling period described zone, species, and zone x species as the significant treatments. Propagule type was not significant indicating the seeded and transplanted areas were similar at this time. Crab burrow densities were highest associated with *Distichlis spicata* in the upper zone. Crab burrows were primarily associated with *Spartina alterniflora* in the middle and lower zones.

169. Species performance with time exemplified stem density, aerial and root biomass and inflorescence production increases over the experimental period. The actual means for each sampling date substantiated the importance of *Spartina patens, Distichlis spicata, Juncus roemerianus,* and *Spartina alterniflora* for transplanted areas. No seeded plots survived in the lower zone and *Juncus roemerianus* was not successfully propagated from seeds.

170. Root to shoot ratios described increasing and decreasing values with time to be species specific. The root to shoot ratio was dependent upon plant growth patterns in that increasing ratios with time indicated a root system comprised of rhizomes during colonization and subsequent production of fibrous roots with maturity, and decreasing ratios with time indicated a dense fibrous root system associated with each tiller during colonization and subsequent thinning to a more homogeneous root structure with maturity.

171. Integrated biomass calculations revealed the transplanted areas contributed more to the development of marsh habitat than the seeded areas. *Borrichia frutescens, Distichlis spicata, Spartina cynosuroides*, and *Spartina patens* were significant contributors to the overall biomass of the upper zone and *Spartina alterniflora* was most important in the middle and lower zones. *Spartina patens, Distichlis spicata* and *Spartina alterniflora* were the most rapidly spreading species.

172. Simple correlation coefficients among the dependent variables reinforced many of the relationships described by the treatment models. Crab burrow density was correlated with stem density, elevation, root biomass and to a lesser extent aerial biomass. This indicated the positive association of vegetation and crab activity. Other correlations suggested condition index, basal area, shoot height and stem density to be reliable indicators of plant health as determined by aerial and root biomass. Elevation was highly correlated with most plant measurements which was consistent with the highly significant treatment of zone from the models. Significant correlations between plant parameters were sometimes restricted to specific zones indicating plant response to elevation was keener than the three intertidal zones described.

173. The response of each species and propagule type to elevation is represented in Table 41. Ranges expressed in hours of inundation delineated survival ranges within the intertidal zone for each species. Seeded propagules performed better at higher elevations (near mean

TABLE 41.

Survival Range Expressed In Mean Hours of Tidal Inundation Per Day For Each Species and Propagule

Plant Species	Propagule	Survival Range †	Optimum Survival Range ††
Borrichia frutescens	sprig	2 - 16	2 - 9
	seed	STL - 8	0 - 8
Distichlis spicata	sprig	MHT + $\frac{1}{4}$ - 14	1 - 7
	seed	1 - 10	1 - 6
Iva frutescens	sprig	1 - 11	3 - 7
	seed	2 - 8	5 - 8
Juncus roemerianus	sprig	1 - 15	1 - 8
	seed	—	—
Spartina alterniflora	sprig	1 - 18	8 - 16
	seed	3 - 16	3 - 13
Spartina cynosuroides	sprig	2 - 11	2 - 8
	seed	MHT + $\frac{1}{8}$ - 11	2 - 8
Spartina patens	sprig	1 - 10	2 - 7.5
	seed	MHT + $\frac{1}{2}$ - 7.5	2 - 6

† = Maximum limits of survival after a minimum of one growing season (6 months).

†† = Estimated optimum range based on biomass/m^2.

STL = Spring tide level.

MHT + $\frac{1}{a}$ MHT = Mean High Tide $\frac{1}{a}$ = fraction of interval from mean high tide to spring tide level.

high tide and above) than did transplanted propagules. The transplanted propagules generally survived over a wider elevational range than the seeded propagules. The optimum survival range described the tidal range in which each species would be expected to survive and propagate. The hours of inundation described the survival range of each species more accurately than the three intertidal zones from the experimental design.

174. Integrating all the plant measurements presented in this section the following general conclusions were drawn: 1) *Spartina patens* (transplanted) and *Distichlis spicata* (either transplanted or seeded) performed the best in the upper third of the intertidal zone. 2) *Spartina alterniflora* was the only significant occupant of the middle and lower third of the intertidal zone. 3) *Borrichia frutescens, Iva frutescens, Juncus roemerianus* and *Spartina cynosuroides*, while providing diversity to the mature marsh habitat, were not the best species for rapid stabilization of dredged material. The planned transplantation of *Spartina alterniflora* into the middle third of the intertidal zone (8-16 hours of inundation per day), and the transplantation or seeding of *Spartina patens* and *Distichlis spicata* into the upper third of the intertidal zone (0-8 hours of inundation per day) would provide the best species combination for rapid stabilization of dredged material. Additional planting of the other experimental species within the upper zone would increase plant diversity and foster the future development of a marsh ecosystem which resembles natural areas. The vegetated dredged material will encourage rapid colonization by fiddler and squareback crabs. The time required for the colonization of the new marsh by snails and mussels could not be determined by this study.

PART IX: MINERAL CONTENT OF EXPERIMENT SPECIES

Introduction

175. A balance of trace minerals and nutrients is essential for maintaining continued growth and propagation of marsh plants. Woodhouse et al. (1974) working with *Spartina alterniflora* developed a regression model utilizing ten plant and soil mineral and nutrient determinations coupled with the soil salinity which correlated significantly with yield. The mineral and nutrients associated with yield included potassium, sodium, calcium, manganese, and phosphorus. The importance of these nutrients to primary production was also suggested by Gallagher et al. (in press) for a Georgia salt marsh. Annual fluctuations of mineral and nutrient concentration levels within plant tissue reflected peak growth periods, senescence and eventual leaching of these substances from dead tissues.

176. Besides accumulation and conversion of nutrients and minerals to plant tissue, marsh plants can also serve to convey these substances through the ecosystem. Reimold (1972) described the action of *Spartina alterniflora* in translocating phosphorus from the soil through the plant tissue. The movement of zinc, manganese and iron through *Spartina alterniflora* was suggested by Williams and Murdock (1969). The most limiting nutrient in marshes other than creekbank marshes was nitrogen. The rapid transformation of nitrogen to plant tissue for most marsh plant species is well documented (Gallagher 1975, Gallagher et al. 1977, Woodhouse et al. 1974, Valiela and Teal, 1974).

177. Mineral and nutrient analysis of the experimental plant species at Buttermilk Sound served to 1) determine mineral changes in plant tissue resulting from fertilization; 2) determine mineral levels in plant tissue as they might relate to the chemical and physical properties of the soil; 3) ascertain mineral levels as they pertain to successful marsh plant establishment.

Methods

178. The plant tissue used in the mineral analysis was collected during the November 1975 and May 1977 sampling intervals. Aerial portions were clipped at soil level from within specified quadrats, bagged and returned to the laboratory for drying. The root matter was the below-ground complement of the aerial matter. The roots were excavated and washed over a 1 mm mesh seive. All root and aerial matter were dried in a forced draft oven at 100°C to a constant weight.

179. The plant tissue was separated by fertilizer level and intertidal zone. The three replicated plots of each fertilizer level were composited by zone. The dried aerial and root matter were ground into a powder with a Wiley mill fitted with a 40 mesh screen. Ground samples were sent to the University of Georgia, Soil Testing Laboratory for the determination of phosphorus, potassium, calcium, manganese, magnesium, iron, boron, copper, zinc, aluminum, strontium, barium, and sodium by spark emmission spectrometry (Jones and Warner, 1969). Nitrogen determination was performed by Kjeldahl digestion in a Technicon Block Digestor/20 and subsequent colorimetric analysis on an Auto Analyzer II system. Significant differences among means were reported at the 0.05 probability level.

Results and Discussion

180. Soil conditions prior to grading (Table 3 and 4) documented extremely low nutrient and mineral content of the substrate used to construct the study area. Tables 10 and 11 depicted the chemical characteristics of the substrate 4½ months after planting. At the time of the destructive sampling only small alterations in the physical and chemical substrate environment were noted.

November 1975

181. The mineral and nutrient content of the woody stemmed Sea Oxeye, *Borrichia frutescens*, is found in Table 42. No difference among

TABLE 42.

NOVEMBER 1975

PLANT TISSUE ANALYSIS, BUTTERMILK SOUND, GEORGIA

Borrichia frutescens

	Fertilizer Level	Tidal Zone	%N	%P	%K	%Ca	%Mg	Mn ppm	Fe ppm	B ppm	Cu ppm	Zn ppm	Al ppm	Sr ppm	Ba ppm	Na ppm
Aerial	1	3	1.62	0.23	1.40	0.52	0.51	67	4730	49	0	9	8800	85	13	40,380
Mom			1.67	0.39	2.66	0.22	0.25	48	1640	33	6	41	1302	71	8	15,400
Aerial	2	3	1.66	0.29	1.38	0.67	0.62	57	4840	54	0	6	7200	96	12	38,760
Mom			1.36	0.36	2.52	0.22	0.25	53	1820	36	8	38	1327	80	9	15,620
Aerial	3	3	1.76	0.29	1.29	0.51	0.50	69	3290	60	0	9	7120	79	10	38,720
Mom			1.41	0.43	2.56	0.20	0.27	49	1810	36	8	38	1392	75	7	15,480
Aerial	4	3	1.57	0.21	1.63	0.53	0.50	70	5020	53	0	12	8300	83	11	23,800
Mom			1.29	0.34	2.28	0.29	0.31	67	2510	41	10	41	2220	80	10	13,150
Aerial	5	3	1.76	0.38	1.45	0.41	0.51	96	5440	55	0	12	8300	83	11	23,880
Mom			1.57	0.41	2.42	0.22	0.24	71	1970	33	9	91	1685	74	9	12,850
Aerial	MEAN		1.67 ±.10	0.28 ±.09	1.43 ±.16	0.53 ±.11	0.53 ±.06	71.8 ±14.5	4664 ±814.3	54.2 ±3.96	0 ±0	9.6 ±2.5	7944 ±923	85.2 ±8	11.4 ±1.4	33,108 ±10,518
Mom			1.46 ±.19	0.39 ±.05	2.49 ±.17	0.23 ±.04	0.26 ±.03	57.6 ±13.2	1950 ±414.1	35.8 ±4.05	8.2 ±1.5	49.8 ±28.6	1585 ±479	76 ±5	8.6 ±1.4	14,500 ±1705

Aerial = Above ground plant tissue; Mom = root matter (Macro organic matter), root material retained by a 1 mm sieve; FERTILIZER LEVEL (1) = NO FERTILIZER, (2) = LOW LEVEL inorganic 122g/m^2, (3) = HIGH LEVEL inorganic 244g/m^2, (4) low level organic 34 g/m^2 (5) high level organic 67 g/m^2; TIDAL ZONE (3) = upper third of intertidal zone, (2) = middle third of intertidal zone, (1) = lower third of intertidal zone; %N = percent nitrogen /gdw of plant tissue; %P = percent phosphorus /gdw of plant tissue; %K = percent potassium /gdw plant tissue; %Ca = percent Calcium /gdw plant tissue; %Mg = percent Magnesium /gdw plant tissue; Mn(ppm) = Manganese mg/l; Fe(ppm) = Iron mg/l; B(ppm) = Boron mg/l; Cu(ppm) = Copper mg/l; Zn(ppm) = Zinc mg/l; Al(ppm) = Aluminum mg/l; Sr(ppm) = Strontium mg/l: Ba(ppm) = Barium mg/l; Na(ppm) = Sodium mg/l; Mean = mean ± 95% confidence interval

fertilizer levels was detected. Phosphorus, potassium, copper, and zinc were all greater in concentration in the root material than for aerial portions. The remaining elements were more concentrated in the aerial portions. Generally, all the plant minerals were in excess of the same minerals in the surrounding substrate. Iron was two magnitudes more concentrated in the plant tissue than in the substrate. It was interesting to note the high sodium concentration remaining in the plant tissue. Since transplanting, the estuarine water at Buttermilk Sound seldom exceeded a salinity of 2 $^{o}/oo$.

182. Nitrogen, potassium, calcium, magnesium, zinc, strontium, and sodium all ranged lower in concentration for *Distichlis spicata* than had been detected for *Borrichia frutescens* (Table 43). No significant differences by fertilizer treatments were noted. Phosphorous, potassium, copper, and zinc were found in greater concentration in root tissue than in aerial portions. The remaining minerals were more concentrated in the aerial parts. Sodium concentrations were much lower for *Distichlis spicata* than they had been for *Borrichia frutescens*.

183. The second of the two woody stemmed plants used on the site was *Iva frutescens* (Table 44). Again, no fertilizer effect was detected and the levels of the minerals were slightly less than those of *Borrichia frutescens*. The similarity of *Iva frutescens* to *Borrichia frutescens* included the excessive sodium concentration of the aerial parts.

184. *Juncus roemerianus* mineral and nutrient concentrations were greater for the aerial portions except copper which was highest in the root tissue (Table 45). Gallagher et al. (in press) determined a number of nutrient levels from living aerial portions of *Juncus roemerianus* in a natural Georgia salt marsh. Much higher concentrations of nitrogen and iron were contained in tissue samples from Buttermilk Sound than from natural *Juncus roemerianus*. The high levels of nitrogen might indicate a fertilizer response; however, areas treated with no fertilizer also contained the high nitrogen levels. When soils are submerged iron is reduced which increases its solubility (Ponnaperuma 1972). Therefore, increases in water soluble iron indicated decreases in soil redox potential (Patrick 1964) and subsequent increased uptake of iron by the rush.

TABLE 43.

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PLANT TISSUE ANALYSIS, BUTTERMILK SOUND, GEORGIA

Distichlis spicata

	Fertilizer Level	Tidal Zone	%N	%P	%K	%Ca	%Mg	Mn ppm	Fe ppm	B ppm	Cu ppm	Zn ppm	Al ppm	Sr ppm	Ba ppm	Na ppm
Aerial	1	3	1.05	0.07	0.43	0.06	0.11	67	4990	8	2	12	1655	27	12	1686
Mom			0.93	0.13	0.74	0.05	0.08	29	2270	6	5	32	3520	23	6	4020
Aerial	2	3	1.13	0.09	0.45	0.06	0.17	147	4780	11	1	20	7160	9	12	1742
Mom			1.00	0.17	1.00	0.02	0.13	43	1510	6	10	45	1735	4	4	2041
Aerial	3	3	1.01	0.11	0.56	0.09	0.15	131	4020	10	4	19	5320	29	15	2019
Mom			1.03	0.13	0.65	0.01	0.07	45	2620	5	5	30	5140	22	6	1667
Aerial	4	3	1.09	0.09	0.51	0.04	0.17	117	4450	10	2	21	7700	8	11	1776
Mom			1.13	0.41	0.91	0.01	0.12	33	1990	7	4	28	2500	4	3	1860
Aerial	5	3	1.14	0.09	0.47	0.04	0.14	194	7600	10	1	20	8850	9	12	1597
Mom			0.94	0.16	0.93	0.03	0.12	57	2430	5	6	39	3000	6	5	1909
Aerial	MEAN		1.08 ±.07	0.09 ±.02	0.48 ±.06	0.06 ±.03	0.15 ±.03	131 ±57	5168 ±1745	9.8 ±1.4	2 ±1.5	18.4 ±4.5	6137 ±3484	16.4 ±13.2	12.4 ±1.9	1764 ±196
Mom			1.01 ±.10	0.20 ±.15	0.85 ±.18	0.02 ±.02	0.10 ±.03	41.4 ±14	2164 ±536	5.8 ±1.0	6 ±3	34.8 ±8.7	3179 ±1585	11.8 ±12.2	4.8 ±1.6	2299 ±1204

Aerial = Above ground plant tissue; Mom = root matter (Macro organic matter), root material retained by a 1 mm sieve; FERTILIZER LEVEL (1) = NO FERTILIZER, (2) = LOW LEVEL inorganic 122g/m^2, (3) = HIGH LEVEL inorganic 244g/m^2, (4) low level organic 34 g/m^2 (5) high level organic 67 g/m^2; TIDAL ZONE (3) = upper third of intertidal zone, (2) = middle third of intertidal zone, (1) = lower third of intertidal zone; %N = percent nitrogen /gdw of plant tissue; %P = percent phosphorus /gdw of plant tissue: %K = percent potassium /gdw plant tissue; %Ca = percent Calcium /gdw plant tissue; %Mg = percent Magnesium /gdw plant tissue; Mn(ppm) = Manganese mg/l; Fe(ppm) = Iron mg/l; B(ppm) = Boron mg/l; Cu(ppm) = Copper mg/l; Zn(ppm) = Zinc mg/l; Al(ppm) = Aluminum mg/l; Sr(ppm) = Strontium mg/l: Ba(ppm) = Barium mg/l; Na(ppm) = Sodium mg/l; Mean = mean ± 95% confidence interval

TABLE 44.

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PLANT TISSUE ANALYSIS, BUTTERMILK SOUND, GEORGIA

Iva frutescens

	Fertilizer Level	Tidal Zone	%N	%P	%K	%Ca	%Mg	Mn ppm	Fe ppm	B ppm	Cu ppm	Zn ppm	Al ppm	Sr ppm	Ba ppm	Na ppm
Aerial	1	3	1.76	0.14	0.78	0.46	0.65	99	5750	41	1	11	1200	77	16	19,120
Mom			1.41	0.26	1.51	0.31	0.27	43	1060	20	18	36	952	57	11	2295
Aerial	2	3	1.29	0.17	0.97	0.40	0.53	43	2690	44	2	56	3860	60	6	20,050
Mom			0.88	0.24	1.25	0.18	0.20	89	4360	19	8	45	4580	36	9	2344
Aerial	4	3	2.28	0.21	0.92	0.57	0.78	57	4520	58	0	67	7600	83	10	22,420
Mom			0.80	0.19	0.91	0.06	0.12	37	2440	11	2	17	4060	35	7	4470
Aerial	MEAN		1.78 ±.79	.17 ±.06	.39 ±.16	.48 ±.14	.65 ±.20	66.3 ±47	4320 ±2471	47.7 ±14.5	1.0 ±1.6	44.7 ±47.6	4220 ±5159	73.3 ±19.4	10.7 ±8.1	20,530 ±2730
Mom			1.03 ±.53	.23 ±.06	1.22 ±.48	.18 ±.20	.20 ±.12	56.3 ±46	2620 ±2659	16.7 ±7.9	9.3 ±13	32.7 ±22.9	3197 ±3148	42.7 ±19.9	9.0 ±3.2	3036 ±1993

Aerial = Above ground plant tissue; Mom = root matter (Macro organic matter), root material retained by a 1 mm sieve; FERTILIZER LEVEL (1) = NO FERTILIZER, (2) = LOW LEVEL inorganic 122g/m^2, (3) = HIGH LEVEL inorganic 244g/m^2, (4) low level organic 34 g/m^2 (5) high level organic 67 g/m^2; TIDAL ZONE (3) = upper third of intertidal zone, (2) = middle third of intertidal zone, (1) = lower third of intertidal zone; %N = percent nitrogen /gdw of plant tissue; %P = percent phosphorus /gdw of plant tissue; %K = percent potassium /gdw plant tissue; %Ca = percent Calcium /gdw plant tissue; %Mg = percent Magnesium /gdw plant tissue; Mn(ppm) = Manganese mg/l; Fe(ppm) = Iron mg/l; B(ppm) = Boron mg/l; Cu(ppm) = Copper mg/l; Zn(ppm) = Zinc mg/l; Al(ppm) = Aluminum mg/l; Sr(ppm) = Strontium mg/l: Ba(ppm) = Barium mg/l; Na(ppm) = Sodium mg/l; Mean = mean ± 95% confidence interval

TABLE 45.

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PLANT TISSUE ANALYSIS, BUTTERMILK SOUND, GEORGIA

Juncus roemerianus

	Fertilizer Level	Tidal Zone	%N	%P	%K	%Ca	%Mg	Mn ppm	Fe ppm	B ppm	Cu ppm	Zn ppm	Al ppm	Sr ppm	Ba ppm	Na ppm
Aerial	1	3	1.75	0.13	0.97	0.06	0.18	37	3230	11	1	28	5980	10	6	11,670
Mom			0.87	0.14	0.92	0.03	0.19	39	2420	9	2	52	3120	7	4	10,060
Aerial	2	3	1.91	0.20	0.98	0.06	0.26	126	4700	16	2	70	3230	28	8	3760
Mom			0.89	0.17	0.67	0.10	0.19	88	3620	10	4	44	3620	19	7	2332
Aerial	3	3	1.20	0.17	1.03	0.03	0.23	486	10,290	20	3	23.3	4429	20	20	4895
Mom			—	—	—	—	—	—	—	—	—	—	—	—	—	—
Aerial	4	3	2.06	—	—	—	—	—	—	—	—	—	—	—	—	—
Mom			0.85	0.18	0.98	0.02	0.22	64	3060	14	2	50	2740	10	6	4236
Aerial	5	3		0.14	0.90	0.07	0.28	53	1980	11	1	90	2600	7	4	9900
Mom			0.75	0.11	0.60	0.06	0.16	123	4720	10	5	41	4140	11	7	2174
Aerial	MEAN		1.73 ±.52	0.16 ±.04	0.97 ±.07	0.06 ±.02	0.24 ±.06	175.5 ±218.0	5050 ±5088	14.5 ±3.6	1.8 ±1.3	52.8 ±45.1	4059.8 ±2065.4	16.3 ±13.3	9.5 ±10.0	7556.3 ±5310
Mom			0.84 ±.09	0.15 ±.04	0.79 ±.26	0.05 ±.05	0.19 ±.03	78.5 ±49.7	3455 ±1354	10.8 ±3.1	3.3 ±2.1	46.8 ±7.1	3405 ±844	11.8 ±7.1	6.0 ±2.0	4700.5 ±5127

Aerial = Above ground plant tissue; Mom = root matter (Macro organic matter), root material retained by a 1 mm sieve; FERTILIZER LEVEL (1) = NO FERTILIZER, (2) = LOW LEVEL inorganic 122g/m^2, (3) = HIGH LEVEL inorganic 244g/m^2, (4) low level organic 34 g/m^2 (5) high level organic 67 g/m^2; TIDAL ZONE (3) = upper third of intertidal zone, (2) = middle third of intertidal zone, (1) = lower third of intertidal zone; %N = percent nitrogen /gdw of plant tissue; %P = percent phosphorus /gdw of plant tissue: %K = percent potassium /gdw plant tissue; %Ca = percent Calcium /gdw plant tissue; %Mg = percent Magnesium /gdw plant tissue; Mn(ppm) = Manganese mg/l; Fe(ppm) = Iron mg/l; B(ppm) = Boron mg/l; Cu(ppm) = Copper mg/l; Zn(ppm) = Zinc mg/l; Al(ppm) = Aluminum mg/l; Sr(ppm) = Strontium mg/l: Ba(ppm) = Barium mg/l; Na(ppm) = Sodium mg/l; Mean = mean ± 95% confidence interval

Reducing conditions exist in a natural *Juncus* marsh, but the substrate at Buttermilk Sound had not reached sufficiently reduced conditions for the release of iron at this time, therefore, the reasons for the increased iron uptake was not clear. Phosphorus, potassium, calcium, and manganese levels at Buttermilk Sound were comparable to natural areas. Sodium levels were high for *Juncus roemerianus*, but lower than the levels of the woody stemmed *Borrichia frutescens* and *Iva frutescens*.

185. The four marsh species discussed thus far had maximum species survival in the upper third of the intertidal zone and were sampled only in that zone. *Spartina alterniflora* survived well in all three intertidal zones, and was sampled in each zone (Table 46). Nitrogen in aerial tissue of *Spartina alterniflora* increased with decreasing elevation (toward creekbank). This was the opposite relationship to that found by Gallagher et al. (in press) and Woodhouse et al. (1974) between creekbank and high marsh *Spartina alterniflora*. Only a limited and sparse population of *Spartina alterniflora* resembling a high marsh (by height class) existed on the experimental area. The nitrogen gradient at Buttermilk Sound appeared to be a zonational difference among creekbank *Spartina* populations rather than a high versus creekbank marsh difference. The overall nitrogen levels of the aerial parts in the middle and lower zones were higher than those reported for creekbank *Spartina alterniflora* (Gallagher et al. in press, Woodhouse et al. 1974). Phosphorus levels also decreased with elevation similar to the magnitude and direction outlined by Woodhouse et al.(1974). Magnesium levels were lower at Buttermilk Sound than those reported by the other authors. Nitrogen, phosphorus, and magnesium concentrations in root tissue varied with elevation as did the aerial portions, but aerial portions were lower in magnitude. Iron levels for *Spartina alterniflora* were highest in the upper and lower zones for aerial portions and highest in the middle zone for root material. Iron concentrations in plant tissue at Buttermilk Sound were much higher for *Spartina alterniflora* than had been reported by Gallagher et al. (in press) and Woodhouse et al. (1974). Sodium levels for *Spartina alterniflora* were high in all zones.

TABLE 46.

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Spartina alterniflora

	Fertilizer Level	Tidal Zone	%N	%P	%K	%Ca	%Mg	Mn ppm	Fe ppm	B ppm	Cu ppm	Zn ppm	Al ppm	Sr ppm	Ba ppm	Na ppm
Aerial	1	3	0.76	0.07	0.76	0.04	0.15	72	6950	10	1	20	9700	12	9	1936
Mom			0.71	0.06	0.97	0.02	0.12	61	2940	8	2	22	3980	26	5	3720
Aerial	2	3	1.00	0.13	1.04	0.19	0.20	85	6150	11	1	21	1100	20	12	11,450
Mom			0.71	0.09	0.98	0.06	0.15	110	4900	8	1	22	5540	4	7	1967
Aerial	3	3	----	0.08	1.21	0.07	0.16	41	4190	8	1	19	5600	25	6	4080
Mom			0.69	0.07	0.82	0.04	0.09	61	2880	6	2	12	6420	42	9	3040
Aerial	4	3	1.10	0.10	1.20	0.09	0.21	105	6180	10	1	44	9450	9	11	9410
Mom			0.63	0.06	0.83	0	0.10	73	4040	6	1	19	4800	2	5	1846
Aerial	5	3	0.84	0.09	1.36	0.13	0.20	94	6010	9	1	38	9350	14	9	9340
Mom			0.70	0.07	1.26	0.03	0.14	91	2910	6	3	61	2940	4	4	1941
Aerial	1	2	0.98	0.08	1.68	0.09	0.18	73	3810	5	1	45	4460	9	4	2084
Mom			0.52	0.02	0.46	0.01	0.04	30	922	4	1	12	1285	6	4	1318
Aerial	2	2	0.82	0.08	1.50	1.13	0.18	88	3930	8	1	30	4960	9	5	2211
Mom			0.50	0.02	0.51	0.01	0.05	43	2570	5	1	11	1910	6	5	1505
Aerial	3	2	1.99	0.28	2.39	0.05	0.16	194	5310	9	2	27	6100	4	6	12,200
Mom			0.62	0.07	0.47	0.01	0.04	69	8660	6	1	6	1170	5	10	1475
Aerial	4	2	1.00	0.11	1.20	0.09	0.20	112	5710	9	1	16	200	8	11	10,700
Mom			0.67	0.06	0.69	0.04	0.11	103	4480	8	4	21	8520	7	10	1851
Aerial	5	2	0.92	0.12	1.73	0.03	0.15	77	2620	8	1	20	2880	6	4	10,060
Mom			0.67	0.10	1.19	0.06	0.13	78	4500	9	2	24	5780	9	9	8620
Aerial	1	1	1.55	0.19	1.30	0.06	0.20	203	4630	9	1	14	5400	8	11	12,700
Mom			0.38	0.03	0.46	0.01	0.02	56	5020	5	1	7	730	4	4	1475
Aerial	2	1	1.66	0.20	1.97	0.07	0.20	146	5030	8	1	22	5740	10	7	12,800
Mom			0.73	0.07	0.78	0.06	0.09	168	5360	8	1	13	3780	6	9	1895
Aerial-	3	1	1.76	0.17	0.95	0.07	0.11	150	5470	8	1	13	9270	27	12	15,540
Mom			0.65	0.08	0.64	0.02	0.05	57	2120	8	2	17	1737	22	8	3020
Aerial	Means	3	0.93	0.09	1.11	0.10	0.18	79.4	5896	9.6	1.0	28.4	7040	16	9.4	7243
			±.21	±.03	±.28	±.07	±.03	±30.4	±1267	±1.4	±0	±14.5	±4619	±8	±3.0	±4994
Mom			0.69	0.07	0.93	0.03	0.12	77.2	3534	6.8	1.8	27.2	4736	15.6	6.0	2503
			±.04	±.02	±.12	±.03	±.03	±25.0	±1124	±1.7	±1.0	±24.0	±1672	±22.0	±2.5	±1038
Aerial	Means	2	1.14	0.13	1.70	0.08	0.17	108.8	1737	7.8	1.2	27.6	3720	7.2	6.0	7451
			±.59	±.10	±.54	±.05	±.02	±62	±3063	±2.0	±.6	±13.9	±2829	±2.7	±3.6	±6067
Mom			0.63	0.05	0.66	0.03	0.07	64.6	4226	6.4	1.8	14.8	3733	6.6	7.6	2954
			±.10	±.04	±.38	±.03	±.05	±35.8	±3584	±2.6	±1.6	±9.3	±4063	±1.9	±3.6	±3933
Aerial	Means	1	1.66	0.19	1.41	0.07	0.17	166.3	5043	8.3	1.0	16.3	6803	15.0	10.0	13,680
			±.17	±.02	±.83	±.01	±.08	±51.1	±674	±.9	±0	±7.9	±3439	±16.8	±4.3	±2586
Mom			0.59	0.06	0.63	0.03	0.05	93.7	4167	7.0	1.3	12.3	2082	10.7	7.0	2130
			±.29	±.04	±.26	±.04	±.06	±103.3	±2857	±2.8	±.9	±8.1	±2494	±15.8	±4.25	±1282

Aerial = Above ground plant tissue; Mom = root matter (Macro organic matter), root material retained by a 1 mm sieve; FERTILIZER LEVEL (1) = NO FERTILIZER, (2) = LOW LEVEL inorganic $122 g/m^2$, (3) = HIGH LEVEL inorganic $244 g/m^2$, (4) low level organic $34 g/m^2$ (5) high level organic $67 g/m^2$; TIDAL ZONE (3) = upper third of intertidal zone, (2) = middle third of intertidal zone, (1) = lower third of intertidal zone; %N = percent nitrogen /gdw of plant tissue; %P = percent phosphorus /gdw of plant tissue; %K = percent potassium /gdw plant tissue; %Ca = percent Calcium /gdw plant tissue; %Mg = percent Magnesium /gdw plant tissue; Mn(ppm) = Manganese mg/l; Fe(ppm) = Iron mg/l; B(ppm) = Boron mg/l; Cu(ppm) = Copper mg/l; Zn(ppm) = Zinc mg/l; Al(ppm) = Aluminum mg/l; Sr(ppm) = Strontium mg/l; Ba(ppm) = Barium mg/l; Na(ppm) = Sodium mg/l; Mean = mean ± 95% confidence interval

186. The only indication of a fertilizer effect was by *Spartina alterniflora* plots in the middle zone fertilized with inorganic fertilizer at a rate of 244 g/m^2. Nitrogen, phosphorus, potassium, and manganese levels in the aerial tissue were significantly higher than any of the other fertilizer treatments.

187. Phosphorus, potassium, copper and zinc concentration levels were all higher for root material than for aerial portions of *Spartina cynosuroides* (Table 47). High iron and sodium concentrations were found for *Spartina cynosuroides* root and aerial tissue. No evidence of a fertilizer effect was noted. Nitrogen levels for *Spartina cynosuroides* were lower than for the other species discussed, but most closely approximated the levels for *Distichlis spicata*. The generally low nutrient levels may reflect the initially poor growth and survival of this species.

188. The aerial portions of *Spartina patens* contained higher concentrations of all nutrients except copper and strontium, than the root tissue (Table 48). Nutrient and mineral concentration ranges were similar to the other six experimental species. Iron and sodium levels were again high for *Spartina patens* aerial and root portions. No fertilizer effect was evident from nutrient and mineral concentrations.

May 1977

189. The lack of significant fertilizer response from the November 1975 sampling period suggested a composite of five tissue samples for each plant part would be sufficient to detect any change in the mineral and and nutrient composition of each species. Samples for all species except *Spartina alterniflora* were restricted to the upper zone and *Spartina alterniflora* samples were composited from the lower and middle zones. Unlike the previous mineral sampling, the May 1977 period fell within the active growing season. Gallagher et al. (in press) suggested nutrient concentrations in plant tissues to become diluted during the active growing season. The November 1975 sampling period reflected the end of the growing season before nutrient accumulation had begun. The May 1977 sampling period represented renewal of rapid growth and subsequent diluting of nutrient levels accumulated over winter. The two forms

TABLE 47.

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Spartina cynosuroides

	Fertilizer Level	Tidal Zone	%N	%P	%K	%Ca	%Mg	Mn ppm	Fe ppm	B ppm	Cu ppm	Zn ppm	Al ppm	Sr ppm	Ba ppm	Na ppm
Aerial	1	3	1.05	0.09	0.63	0.13	0.28	77	3190	8	2	42	6360	6	9	2301
Mom			1.01	0.09	0.99	0.04	0.14	93	4340	8	2	31	4260	6	6	1798
Aerial	2	3	1.21	0.12	0.60	0.10	0.31	146	5430	7	0	31	6180	1	10	2270
Mom			0.96	0.15	1.09	0.03	0.14	56	1900	6	5	34	2660	3	4	1985
Aerial	3	3	1.00	0.10	0.55	0.06	0.20	94	3670	5	0	20	4740	5	7	10,470
Mom			0.80	0.13	1.10	0	0.09	45	2040	5	4	30	2420	3	3	2005
Aerial	4	3	1.00	0.11	0.47	0.16	0.24	286	6550	10	1	30	6720	6	17	9670
Mom			1.08	0.12	1.19	0.01	0.13	91	2690	7	6	28	4140	4	6	1988
Aerial	5	3	1.00	0.05	0.52	0.05	0.15	37	3500	7	6	12	8400	27	6	9460
Mom			0.65	0.11	1.04	0.03	0.11	97	3610	6	2	24	4980	5	6	1878
Aerial	MEAN		1.05 ±.11	.09 ±.03	.55 ±.08	.10 ±.06	.24 ±.08	128 ±120	4468 ±1803	7.4 ±2.3	1.8 ±3.1	27 ±14	6476 ±1626	9 ±13	9.8 ±5.4	6834 ±5167
Mom			.90 ±.22	.12 ±.03	1.08 ±.09	.02 ±.02	.12 ±.03	76.4 ±30	2916 ±1294	6.4 ±1.4	3.8 ±2.2	29 ±5	3692 ±1367	4.2 ±1.6	5.0 ±1.8	1931 ±111

Aerial = Above ground plant tissue; Mom = root matter (Macro organic matter), root material retained by a 1 mm sieve; FERTILIZER LEVEL (1) = NO FERTILIZER, (2) = LOW LEVEL inorganic 122g/m^2, (3) = HIGH LEVEL inorganic 244g/m^2, (4) low level organic 34 g/m^2 (5) high level organic 67 g/m^2; TIDAL ZONE (3) = upper third of intertidal zone, (2) = middle third of intertidal zone, (1) = lower third of intertidal zone; %N = percent nitrogen /gdw of plant tissue; %P = percent phosphorus /gdw of plant tissue; %K = percent potassium /gdw plant tissue; %Ca = percent Calcium /gdw plant tissue; %Mg = percent Magnesium /gdw plant tissue; Mn(ppm) = Manganese mg/l; Fe(ppm) = Iron mg/l; B(ppm) = Boron mg/l; Cu(ppm) = Copper mg/l; Zn(ppm) = Zinc mg/l; Al(ppm) = Aluminum mg/l; Sr(ppm) = Strontium mg/l: Ba(ppm) = Barium mg/l; Na(ppm) = Sodium mg/l; Mean = mean ± 95% confidence interval

TABLE 48.

NOVEMBER 1975

PLANT TISSUE ANALYSIS, BUTTERMILK SOUND, GEORGIA

Spartina patens

	Fertilizer Level	Tidal Zone	%N	%P	%K	%Ca	%Mg	Mn ppm	Fe ppm	B ppm	Cu ppm	Zn ppm	Al ppm	Sr ppm	Ba ppm	Na ppm
Aerial	1	3	1.05	0.16	0.60	0.07	0.11	182	7460	8	1	20	9500	7	14	2270
Mom			0.67	0.12	0.74	0.02	0.11	137	4020	7	2	39	6060	6	7	1826
Aerial	2	3	1.05	0.16	0.60	0.07	0.11	182	7460	8	1	20	9500	7	14	2270
Mom			1.12	0.19	0.70	0.04	0.10	63	2770	7	6	79	5680	24	8	3680
Aerial	3	3	1.17	0.18	1.04	0.17	0.17	89	3880	6	1	21	5520	6	12	9580
Mom			0.62	0.10	0.62	0.11	0.04	37	967	6	1	26	1665	5	4	1667
Aerial	4	3	1.14	0.13	1.04	0.15	0.17	157	4510	9	2	25	6500	3	14	8430
Mom			0.66	0.08	0.78	0.01	0.06	32	2200	5	1	23	1682	6	6	1912
Aerial	5	3	1.27	0.13	0.97	0.15	0.19	65	3460	5	0	20	6500	10	10	2090
Mom			1.24	0.17	1.09	0.01	0.09	46	2500	8	2	45	3960	6	6	8330
Aerial	MEAN		1.14 ±.11	.15 ±.03	.85 ±.29	.12 ±.06	.15 ±.05	135 ±68	5354 ±2427	7.2 ±2.0	1.0 ±.9	21.2 ±2.7	7504 ±2312	6.6 ±3.1	12.8 ±2.2	4928 ±4641
Mom			.86 ±.36	.13 ±.06	.79 ±.22	.04 ±.05	.08 ±.04	63 ±53	2491 ±1360	6.6 ±1.4	2.4 ±2.6	42.4 ±27.7	3809 ±2608	9.4 ±10.1	6.2 ±1.8	3483 ±3508

Aerial = Above ground plant tissue; Mom = root matter (Macro organic matter), root material retained by a 1 mm sieve; FERTILIZER LEVEL (1) = NO FERTILIZER, (2) = LOW LEVEL inorganic 122g/m^2, (3) = HIGH LEVEL inorganic 244g/m^2, (4) low level organic 34 g/m^2 (5) high level organic 67 g/m^2; TIDAL ZONE (3) = upper third of intertidal zone, (2) = middle third of intertidal zone, (1) = lower third of intertidal zone; %N = percent nitrogen /gdw of plant tissue; %P = percent phosphorus /gdw of plant tissue; %K = percent potassium /gdw plant tissue; %Ca = percent Calcium /gdw plant tissue; %Mg = percent Magnesium /gdw plant tissue; Mn(ppm) = Manganese mg/l; Fe(ppm) = Iron mg/l; B(ppm) = Boron mg/l; Cu(ppm) = Copper mg/l; Zn(ppm) = Zinc mg/l; Al(ppm) = Aluminum mg/l; Sr(ppm) = Strontium mg/l; Ba(ppm) = Barium mg/l; Na(ppm) = Sodium mg/l; Mean = mean ± 95% confidence interval

of *Spartina alterniflora* and *Juncus roemerianus* from Gallagher et al. (in press) contained nearly equal levels of manganese, potassium, and calcium; and lower levels of iron for only *Juncus roemerianus* in May as compared to November.

190. A summary of soil changes from 1975 to 1977 relative to the mineral content of the experimental vegetation included reduction of the redox potential in the middle and lower zones, increased levels of phosphorus, nitrogen, iron, copper, potassium, calcium, magnesium and maganese, and increased cation exchange capacity and organic matter content. Overall the soil qualities improved greatly and more closely resembled normal marsh soils.

191. Nitrogen levels in aerial tissue were similar for all species except *Spartina cynosuroides* (which was much lower) for the May 1977 sampling period (Table 49). The nitrogen levels for *Spartina alterniflora* at Buttermilk Sound were similar to levels recorded by Woodhouse et al. (1974) and slightly lower than the levels recorded by Gallagher et al. (in press). *Juncus roemerianus* and *Spartina alterniflora* contained the highest nitrogen levels for root tissue of all species. Phosphorus, calcium, and magnesium levels for all species were similar to levels in 1975. Potassium levels increased in aerial and root tissue for all species. Iron levels dropped substantially in root and aerial tissue for all species except *Spartina alterniflora*. Root material from *Spartina alterniflora* contained iron concentrations in excess of 30,000 ppm. The greater uptake of iron by root material as compared to aerial portions was consistant with the findings of Lee et al. (1976) for *Spartina alterniflora*. The reduced soil redox potential in the middle and lower zones (where *Spartina* was sampled) may have caused more water soluble iron to be available to the plants. Copper levels increased for most species while aluminum levels decreased. *Spartina alterniflora* root material contained the highest levels of aluminum. The nutrient and mineral levels varied among species and plant parts much the same as in November, 1975; however, the May 1977 provided increases or decreases in

Table 49.

May 1977

Plant Tissue Analysis, Buttermilk Sound, Georgia

Species		%N	%P	%K	%Ca	%Mg	Mn ppm	Fe ppm	B ppm	Cu ppm	Zn ppm	Al ppm
Borrichia frutescens	aerial	1.08	0.32	3.10	0.62	4.61	46	820	75	11	16	2020
	mom	0.60	0.33	2.35	0.13	0.24	42	760	22	10	18	1790
Distichlis spicata	aerial	1.08	0.11	0.95	0.10	0.26	56	2710	10	<5	16	5600
	mom	0.30	0.09	1.03	0.05	0.15	42	760	22	5	28	3050
Iva frutescens	aerial	1.09	0.22	1.45	0.84	0.84	65	1160	54	12	84	2610
	mom	-	-	-	-	-	-	-	-	-	-	-
Juncus roemerianus	aerial	1.08	0.09	1.53	0.14	0.23	32	248	5	<5	13	505
	mom	1.08	0.20	1.77	<0.50	0.25	31	760	12	5	102	1650
Spartina alterniflora	aerial	1.08	0.10	1.71	0.10	0.24	153	760	6	5	17	1790
	mom	1.00	0.11	1.11	0.06	0.15	103	30,100	11	<5	12	10,360
Spartina cynosuroides	aerial	0.58	0.05	0.94	0.05	0.13	32	248	5	5	13	505
	mom	0.92	0.09	1.45	<0.05	0.15	33	1140	8	5	30	2150
Spartina patens	aerial	1.08	0.16	1.00	0.14	0.18	34	488	6	5	11	2580
	mom	0.33	0.23	0.98	<0.50	0.18	99	1800	11	8	82	6450

Aerial = Above ground plant tissue; Mom = root matter (macro organic matter), root material retained by a 1 mm sieve; %N = Percent Nitrogen/gdw of plant tissue; %P = Percent Phosphorus/gdw of plant tissue; %K = Percent Potassium/gdw of plant tissue; %C = Percent Calcuim/gdw of plant tissue; %Mg = Percent Magnesium/gdw of plant tissue; Mn(ppm) = Manganese in parts per million; Fe(ppm) = Iron in parts per million; B(ppm) = Boron in parts per million; Copper(ppm) = Copper in parts per million; Zn(ppm) = Zinc in parts per million: Al(ppm) = Aluminum in parts per million.

magnitude. The changes approached levels documented for *Spartina alterniflora* and *Juncus roemerianus* in natural areas (Woodhouse et al. 1974, Gallagher et al. in press).

Summary

192. Initially the plant tissue of the experimental species at Buttermilk Sound expressed a somewhat disproportional nutrient and mineral balance. Key elements including nitrogen, phosphorus, manganese and iron were higher than levels documented for natural areas. The stress of transplantation to a mostly aerobic and more frequently submerged environment than the majority of species were accustomed to may have initiated this imbalance. The changes in the nutrient and mineral levels by May 1977 more closely approximately the levels expected for *Spartina alterniflora* and *Juncus roemerianus*. The other species exhibited nutrient and mineral concentration changes similar in direction to *Spartina alterniflora* and *Juncus roemerianus*, thus most likely better approximated their normal mineral concentrations. A general improvement of nutrient and mineral concentrations and improved physical characteristics of the soil at Buttermilk Sound fostered the improved nutrient balance of the marsh plants. Only one indication of a fertilizer effect was noted for *Spartina alterniflora* while the other six species showed no nutrient changes (phosphorus, nitrogen, potassium) related to fertilizer level. The extremely high iron levels in all plant tissues in November 1975 was attenuated to more normal levels by May 1977.

PART X: *SPARTINA ALTERNIFLORA* TRANSPLANTATION

Introduction

193. The value of salt marshes as the basis of the estaurine food web and as nursery areas for marine fishes and invertebrates is becoming increasingly evident (Teal 1962; Odum and dela Cruz 1967; Williams and Murdock 1969; Gosselink et al. 1974). The mounting evidence supporting marshlands preservation has fostered research aimed at developing techniques for the re-establishment of destroyed marsh (Ristich et al. 1976). Dredging operations along the Atlantic & Pacific coasts of the United States, necessary for the maintenance of waterways navigability, has created problems in dredged material disposal and subsequent stabilization. A number of studies have addressed this problem (Woodhouse et al. 1972, 1974; San Francisco District ACE, 1976; Garbisch, 1977).

194. The techniques for transplantation of marsh plants have been established (Woodhouse et al. 1974, Statler & Batson 1969) and optimum transplantation months suggested (Woodhouse et al. 1976, Knutson 1977). Unlike most east coast salt marshes *Spartina alterniflora* continues to grow throughout the calender year in Georgia (Gallagher et al. in press). This marsh trait suggested the need to determine the optimum transplantation period for Georgia salt marshes.

Methods

195. Initial phases of the present study had determined the middle third of the intertidal zone to be the optimum tidal regime for the transplantation of *Spartina alterniflora*. Many of the experimental species (*Borrichia frutescens*, *Distichlis spicata*, *Iva frutescens*, *Spartina cynosuroides* and *Spartina patens*) had died or were washed out of the middle zone. A random selection of 91 plots that had failed constituted the experimental plots for the transplantation study.

196. The 91 plots were completely randomized such that 7 plots

were transplanted every 30 days beginning May 1976 through May 1977. Sprigs were selected from adjacent *Spartina alterniflora* marshes using the criteria set forth by Woodhouse et al. (1974). Sprigs were dug, immediately before planting, from the fringes of adjacent marshes (where singular culms in the sandy substrate were abundant). These sprigs represented transplanting stock available at each month throughout the year. Each plot (1.5 x 3.0 m) was sprigged with 10 singular culms on 0.5 m centers.

197. Percent survival was based on the survival of the ten transplanted hills. Live and flowering culm densities were determined for each hill within the plot, averaged and set equal to 0.25 m^2 (the equal area available to each sprig planted on 0.5 m centers). As the plot matured and the individual hills coalesced, a 0.1 m^2 quadrat was used for density determinations. Aerial and root biomass were determined on 0.1 m^2 sample areas according to harvest methods outlined by Reimold and Linthurst (1977). Root material was excavated using a shovel and washed over a 1 mm sieve thus all material greater than 1 mm was retained as macro organic matter (MOM). All biomass data were expressed in grams dry weight per metre square (gdw/m^2). Root to shoot ratios were calculated by dividing root biomass by aerial biomass for each plot. The ratio of flowering culm density to live culm density was also calculated. Percent survival, live culm density and flowering culm density were determined bimonthly for each plot. Aerial and root biomass were determined in October 1976 and again in November 1977. The soil temperature at a depth of 8 cm was determined each month on the day of planting. Analysis of variance was performed using a general linear model procedure (Barr et al. 1976) and significant differences among means were determined using Duncan's Multiple Range Test at the 0.05 significance level.

Results and Discussion

198. A random sampling of representative sprigs (n=50) was

collected and weighed yielding a mean aerial biomass of 2.09 gdw/plant and a mean root biomass of 1.63 gdw/plant at the time of transplantation. The combined aerial and root biomass of the sprigs ranged from 0.8 gdw/plant to 9.8 gdw/plant. The larger sprigs were encountered during the early summer months.

199. The elevation of each plot (mean of 5 points) was determined in April 1977. The means of each planting date ranged from 1.013 to 1.231 m (above mean low water) with no significant differences among sampling dates.

200. Soil characteristics for the duration of the transplanting experiment were documented in Part VI for the middle third of the intertidal zone. In May 1976 the substrate was covered with a 0.2 - 1.5 cm layer of silt in most areas. This layer appeared during the spring and summer months and disappeared in the winter months. The layer reappeared in the spring of 1977 and accumulated to a depth of 8 cm in some areas. The middle zone (experimental area) was almost completely covered by the silt layer in November 1977. Some accumulation of silt and organic detritus to a depth of 6 cm had occurred within the substrate when the experiment was initiated. This may have contributed to greater initial transplanting success for this experiment as compared to transplanting success in June 1975.

201. An analysis of variance (Appendix G) was performed utilizing data collected on November 1977. Problems with length of response time were associated with the model testing each planting date; however, comparison of actual means helped to better interpret significant differences. Table 50 depicts means for each transplant month as of November 1977.

202. Culm densities for the transplanted areas ranged from 132.9 to 381.4 culms/m^2. High mean densities were recorded for May 1976 and 1977, February and August 1976. The low densities were exhibited by the December and July 1976 planting dates.

203. Flowering culm densities were greatest for February, March, May (1976), and April and May (1977). Lowest seedhead production was

TABLE 50.

Spartina alterniflora transplant response as of November 1977

Planting date	Live Stem gdw/m^2	Aerial Biomass gdw/m^2	Root Biomass gdw/m^2	Flowering $Stem/m^2$	Percent Survival of Plots
May 1976	347	812	637	48	100
June 1976	183	434	403	30	100
July 1976	247	791	851	60	43
August 1976	253	535	527	20	100
September 1976	164	670	560	22	71
October 1976	237	320	233	28	100
November 1976	214	630	369	48	100
December 1976	127	183	188	14	100
January 1977	250	501	363	34	100
February 1977	268	642	642	54	100
March 1977	483	1280	1391	94	100
April 1977	372	900	1107	50	86
May 1977	387	1123	515	54	100

for December and October 1976. Seedhead production was indicative of stand maturation and added survival advantage, if the seeds were able to germinate in the area.

204. Mean root biomass production ranking, starting with highest biomass, was March, January, April, May 1976 and May 1977. The grouping of the late winter and early spring months indicated that an early growing season planting date was necessary to produce a large root biomass. Root biomass production was considered the most important growth parameter since it stabilized the substrate and insured over winter survival of the plants.

205. March (1977), November (1976), May (1976), and January (1977) were the most productive months in terms of aerial biomass production. The lowest aerial biomass was recorded for June, December, July and October (1976). Aerial production was considered important to estuarine food chains, but was of reduced importance when establishing salt marshes.

206. The root to shoot ratio for May (1976) exceeded 2.0 and for December (1976), November (1976) and January and April (1977) exceeded 1.5. Ratios near 2.0 indicated a heavy root mat able to resist strong erosive pressures. Ratios tended to increase with the age of the planted area.

207. The ratio of flowering culm to live culm density showed February to have the highest ratio (0.19). This ratio was greatest for transplanted plants at the end of the first growing season (October 1976) as evidenced by a 0.20 and 0.17 ratio for August (1976) and May (1976) planting dates, respectively.

208. Soil temperature (Figure 35a) showed seasonal changes for the marsh. The unusually cold winter of 1977 was reflected in a minimum soil temperature of 7°C in February. The high survival and growth response of the February transplants indicated the cold had no adverse affects.

209. Transplant survival (Figure 35b) showed poor survival rate for plots transplanted during the summer months. The remaining months exhibited good survival comparable to rates achieved by Woodhouse et al

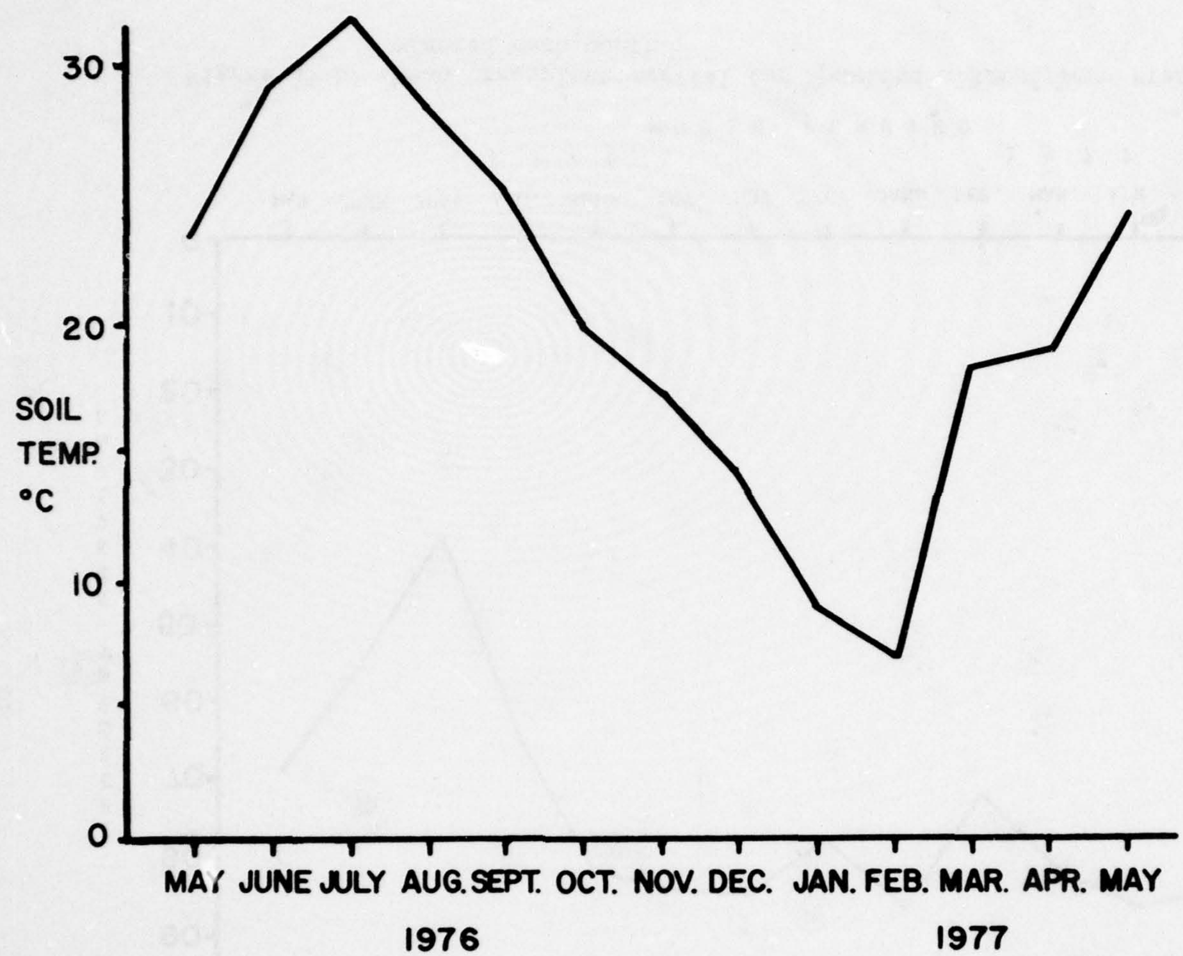

Figure 35a. Soil temperature in degrees centegrade at time of transplanting *Spartina alterniflora* transplants each month.

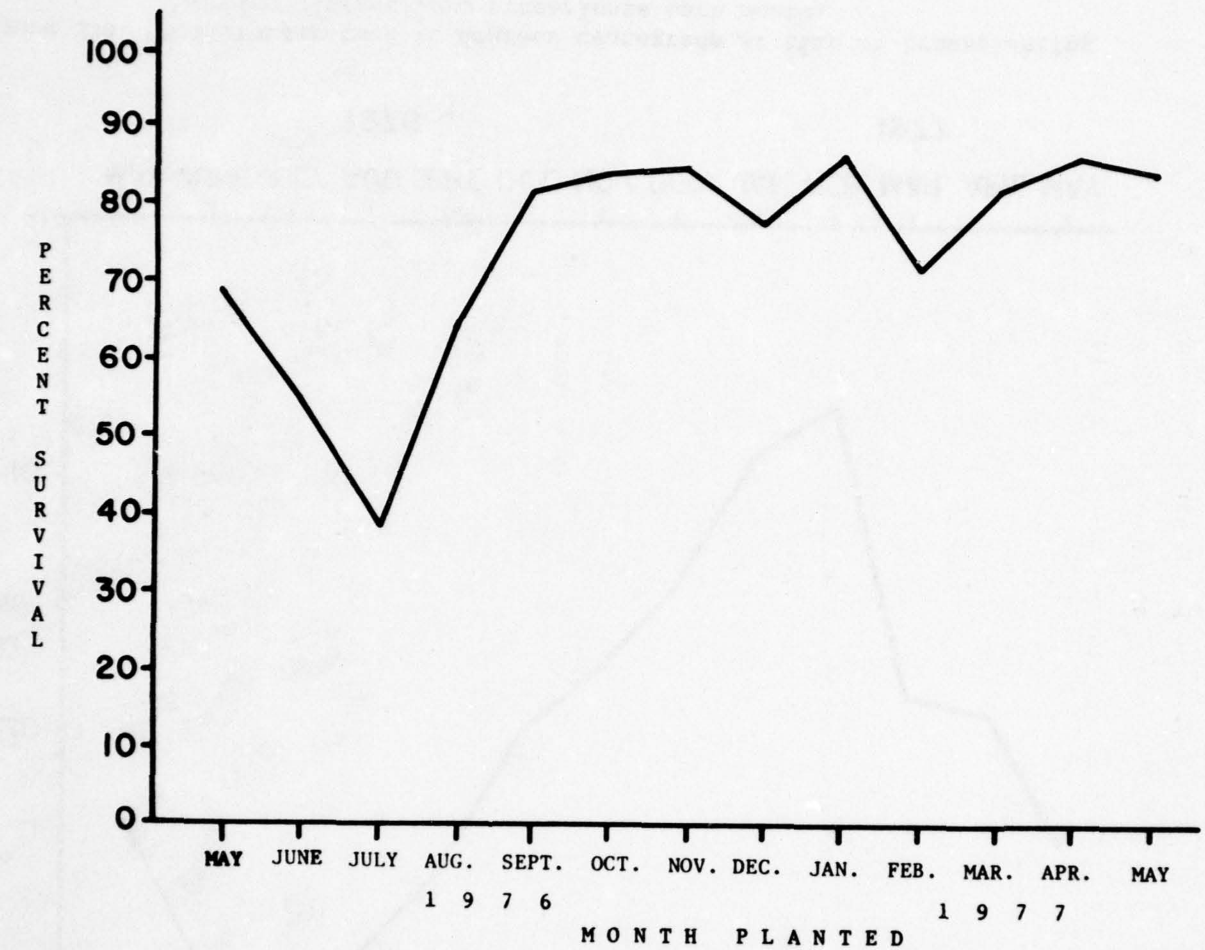

Figure 35 b. Mean transplant survial for *Spartina alterniflora* transplanted each month.

(1974).

210. Figures depicting plant parameter changes with time for each planting date and a comparison of flowering and culm density of each planting date at the end of the 1976 and 1977 growing seasons can be found in Appendix G.

Summary

211. Few significant differences among the plant parameter means were noted for the different planting dates. The lack of significant differences suggested a more arbitrary method of selecting optimum transplanting months. The four measured plant parameters culm density, flowering culm density, root and aerial biomass, and the root to shoot ratio means were ordered and ranked for each planting date. Subsequent summation of rank scores for each planting date provided a relative index of planting success. The best transplanting date was May 1976 followed by March, April, January and February 1977, based on this index. Some bias may have entered as a result of the May (1976) planting having two growing seasons in which to manifest a response. If the May planting date is disregarded, the optimum transplanting months for *Spartina alterniflora* are January through April with the greatest success in March and April. Woodhouse et. al. 1976 and Knutson 1977 suggested March, April and May to be optimum for the east coast. The climatological differences (milder winters) associated with a more southerly latitude allows successful transplantation during the winter months in Georgia.

PART XI: BUTTERMILK SOUND INVADERS

212. Monitoring of invasion by plant species other than those planted was an important aspect of habitat development. After grading and successful establishment of the sprigged plots,the substrate began to accumulate silt, providing a much more favorable substrate for the propagation of a variety of volunteering species. Plots designated by species 8 were included in the experimental design as a control for documenting natural invasion. Frequency tables were constructed by year, season, and zone to assess invading pressure on each planted species (Appendix H). The occurrence of a species within a plot had a frequency of one (1) for each sampling interval. The stem densities of each species was considered in the last portion of this section. Table 51 contains the species names and code number found on the tables in Appendix H. In many cases, the chi square statistic for the frequency tables (Appendix H) was significant, indicating departure from independence; however, the inclusion of invading species code 0 (test plots with no invaders) caused the distribution to appear to have dependent qualities.

213. The tables (Appendix H) labeled fall season of 1975 covered the initial planting (June, 1975 through December, 1975). The lower and middle third of the intertidal zones had no invaders during this period. The upper zone had three occurrences each of *Pontederia cordata*, pickerelweed, and *Sesbania exaltata*, coffee bean weed. The invading species each occupied 1 percent of the plots tested; 97 percent of the plots were free of invading species.

214. Spring of 1976 brought a number of new invaders to the upper and middle intertidal zones. In the middle zone, 25 percent of the plots were invaded by *Spartina alterniflora* mostly through the appearance of a large number of seedlings. *Scirpus americanus* and *Scirpus robustus* also began to appear. Plots lacking invaders declined

Table 31.

Cumulative Species Composition List for

Buttermilk Sound Marsh Habitat Development Site

May 1975 - November 1977

Code Number	Scientific Name	Common Name	Year Recorded 1975	1976	1977
01	Unidentified (Indicates Invader Was Present)		X	X	X
02	*Borrichia frutescens* (L.) DC.	Sea-Ox-Eye		X	X
03	*Distichlis spicata* (L.) Greene	Spike-Grass		X	X
04	*Iva frutescens* L.	Marsh-Elder		X	X
05	*Juncus roemerianus* Scheel	Rush			
06	*Spartina alterniflora* Loisel	Salt-Water Cord-Grass		X	X
07	*Spartina cynosuroides* (L.) Roth	Salt Reed-Grass		X	X
08	*Spartina patens* (Ait.) Muhl.	Salt-Meadow Grass		X	X
09	*Acnida cannabina* L.	Water-Hemp		X	X
10	*Baccharis halimifolia* L.	Sea-Myrtle		X	X
11	*Boltonia asteroides* L. L'Hér	Boltonia		X	X
12	*Cyperus esculentus* L.	Yellow Nut-Grass		X	X
13	*Eleusine indica* (L.) Gaertn.	Goose-Grass		X	X
14	*Pluchea purpurascens* (Sw.) DC.	Marsh-Fleabane		X	X
15	*Polygonum punctatum* Ell.	Water-Smartweed		X	X
16	*Pontederia cordata* L.	Pickerel-Weed	X	X	X
17	*Sagittaria falcata* Pursh	Arrowhead		X	
18	*Scirpus americanus* Pers.	Three-Square Bulrush		X	X
19	*Scirpus robustus* Pursh	Bulrush		X	X
20	*Scirpus validus* Vahl	Great Bulrush		X	X
21	*Typha domingensis* Pers.	Cat-Tail		X	
22	*Zizania aquatica* L.	Wild Rice			
23	*Zizaniopsis miliacea* (Michx.) Doll & Aschers	Water Millet		X	X
24	*Sesbania exaltata* (Raf.) Cory	Coffee-Bean Weed	X	X	X
25	*Panicum* sp. L.	Panic Grass			X
26	*Cynodon dactylon* (L.) Pers.	Bermuda Grass			X
27	*Ptilimnium capillaceum* (Michx.) Raf.	Mock Bishop's Weed			X
28	*Aster subulatus* Michx.	Aster			X
29	*Aster tenuifolius* L.	Aster			X
30	*Solidago sempervirens* L.	Seaside Goldenrod			X
34	*Phytolacca americana* L.	Pokeweed			X
35	*Digitaria sanguinalis* (L.) Scop.	Crab-Grass			X
36	*Cenchrus pauciflorus* (Benth.)	Field Sand Bur			X
37	*Hibiscus moscheutos* L.	Swamp-Rose			X
38	*Ludwigia* sp. L.	Water Primrose			X
39	*Panicum virgatum* L.	Switch-Grass			X
40	*Bidens cernua* L.	Nodding Beggar Ticks			X
41	*Rumex verticillatus* L.	Swamp-Dock			X
42	*Cicuta maculata* L.	Spotted Cowbane			X

Code Number: Species number used for two way tables of invading species in Appendix H
Fernald, M. L., Gray's Manual of Botany, 8th ed., Nostrand, New York, 1970.

to 66 percent from 100 percent in 1975 for the middle zone. In the upper third of the intertidal zone, *Acnida cannabina, Baccharis halimifolia, Eleusine indica, Scirpus americanus,* and *Sesbania exaltata* were the major non-planted invaders. Invasion by planted species spreading into other plots accounted for 33 percent of the total. Non-invaded plots dropped to 87 percent.

215. The summer and fall months of 1976 are contained in the tables (Appendix H) labeled Fall, 1976. The only invasion noted in the lower intertidal zone was that of *Spartina alterniflora*. The middle zone had two new invaders, *Acnida cannabina* and *Pluchea purpuracens*. *Spartina alterniflora* remained as the primary invader of the middle zone occupying some 65 percent of the plots not designated for this species. Of the plots lacking any invasion (23 percent), 70 percent were planted *Spartina alterniflora* plots. *Spartina alterniflora* occurred in 72 percent of the actual control plots, illustrating much the same trend manifest for the whole zone.

216. The species composition of the upper intertidal zone changed markedly during the Fall, 1976 interval. *Cyperus esculentus, Polygonum punctatum, Pluchea purpuracens, Scirpus robustus, Scirpus validus, Typha domingensis* and *Zizaniopsis miliacea* were all newcomers to this area. Planted species in this zone began spreading into adjacent plots as noted by their percent invasion (percent of plots invaded by each species): *Distichlis spicata* - 16 percent, *Spartina alterniflora* - 9 percent, and *Spartina patens* - 7 percent. Analysis of the percent of plots for each not invaded by other species, *Distichlis spicata* - 75 percent, *Spartina alterniflora* - 39 percent, and *Spartina patens* - 42 percent, indicated that these species may resist invasion to an extent. Invasion frequency partitioned by each species was fairly even providing no evidence of selective invasion. Most of the volunteer species would be classified as fresh or brackish water species, which was consistent with the much depressed salinity levels at the site. The percentage of plots lacking any invasion decreased to 27 percent. The most abundant invader other than planted species was *Scirpus robustus* occurring in

nearly 4 percent of all plots. This saltmarsh bulrush had been observed on numerous unmarked brackish water dredged material disposal sites in the area. The natural plant invasion of the site and observed success on dredged substrate suggested *Scirpus robustus* might be a future candidate for similiar transplantation and habitat creation projects. The control plots, by Fall 1976, began to surpass the planted plots in terms of frequency of invasion, although had only control plots been considered to estimate invasion pressure, nine species would not have been determined.

217. The development of soil, by silt and organic matter accumulation, had begun to accelerate at the site by Fall 1976 (Part VI). The substrate development increased the adhesive and cohesive properties of the substrate, thus providing a more favorable medium for attracting and holding the water borne seeds of many of the invaders. These soil properties were important to the marsh during early plant successional stages. Grouping invader freqency by fertilizer level showed no preference and grouping by propagule type revealed 45 percent of the invaders were found in transplanted plots and 55 percent were in the newly seeded plots. This was a reversal of the trend of the spring season. Invasion frequency for each zone was as follows: 82 percent of plots not invaded and less than 1 percent of all invasion found in the lower zone; 23 percent of plots not invaded and 34 percent of all invasion found in the middle zone; and 27 percent of plots not invaded and 65 percent of all invasion found in the upper zone. This clearly indicated the high invasion pressure experienced in the upper zone.

1977

218. The winter and spring months of 1977 comprised the next interval titled Spring season, 1977. The lower intertidal zone again had *Spartina alterniflora* as the sole invading species. The large abundance of seedlings seen in 1976 were not present in 1977.

219. The middle zone experienced continued changes in species composition during spring 1977 (Figure 36). New species invading the area included *Eleusine indica, Polygonum punctatum, Sagittaria lancifolia, Zizania aquatica, Zizaniopsis miliacea, Sesbania exaltata, Panicum*

Figure 36. Invasion of the middle zone by *Acnida cannabina* and *Pluchea purpuracens* (August 1977).

sp. and *Cynodon dactylon*. The percent occurrence (frequency) for each species suggested *Spartina alterniflora* (39 percent) to be the most common invader, *Acnida cannabina* (29 percent) next and *Panicum* sp. (4 percent) next, with all other species under 4 percent. *Spartina alterniflora* was the only species to have greater than 20 percent of the plots not invaded. The frequency of invasion by each planted species ranged from 10.3 percent to 12.5 percent indicating no preferential invasion. The frequency of occurence for each invading species found in the control plots ranked in the same order as did the zone as a whole although the absolute magnitudes were different. Consideration of only control plots would have lacked nine invaders already encountered.

220. The upper third of the intertidal zone had *Panicum* sp., *Cynodon dactylon*, and *Cicuta maculata* as new species to the zone for the spring season, 1977. Up to 1977, invasion by plants had been minimal (numbers of individuals), but in 1977 the combination of planted and invading species nearly eliminated all bare areas in the upper zone. This extreme invasion pressure must be noted since the frequencies represented do not reflect the large density increase (Figure 37). The entire zone had only 3 percent of the plots lacking invasion with only *Spartina patens* showing a significant resistance to invasion of 9 percent. The thick mat formed by lodged *Spartina patens* culms was the deterrent reflected in the higher percent of *Spartina patens* plots lacking invasion. Ranking of invading species by frequency of occurrence revealed *Acnida cannabina* (23 percent) to be most prevalent, then *Distichlis spicata* (15 percent), *Panicum* sp. (9 percent), *Eleusine indica* (8 percent), *Sesbania exaltata* (6 percent), *Borrichia frutescens* (5 percent), *Scirpus robustus* (5 percent) and all other species less than 5 percent. *Acnida cannabina* was an annual plant and accomplished its wide dispersion via seeds. Species such as *Distichlis spicata, Borrichia frutescens,* and *Scirpus robustus* rely primarily on rhizome growth for the spread of each stand.

221. Invasion pressure considered over all zones was evenly distributed among the eight test species. Analysis of invasion

Figure 37. Invasion of the upper zone by *Acnida cannabina* and *Sesbania exaltata* (August 1977).

pressure by fertilizer level showed no fertilizer preference and analysis by propagule type revealed sprigged plots to contain a higher percentage of non-invaded plots (64 percent vs 36 percent). Control plots had a similar frequency distribution of invaders to that of all the plots, yet three species found elsewhere on the site, were absent from the control areas. The increasing efficiency of the control plots in estimating invader frequency was the result of large numbers of invaders and their more homogenous distribution across the areas.

222. Comparing each zone for the spring 1977 interval, the interaction of invasion pressure and elevation (intertidal zone) became more prevalent. The lower zone had less than 1 percent of the invasion, the middle zone had 31 percent and the upper zone had 68 percent. This was a more lopsided gradient than had been seen in earlier intervals. The majority of volunteer species normally exist in a high brackish or fresh marsh or on the upland, thus providing an explanation for the extensive propagation of new species in the upper reaches of the marsh development site.

223. The numbers of invaders continued to grow during the Fall, 1977 interval. The numbers had become so great that recording of invading species in every plot consumed too much time, thus new methods of documenting invaders were developed. Five random one metre transects running from mean high to mean low water were selected and monitored. The transects were sampled using one square metre contiguous plots from the upper to the lower limit of the elevational gradient and all invaders and their densities were recorded (Figure 38). Besides providing a random sampling of invaders across the elevational gradient, this allowed the transects to be surveyed to determine the elevation of each segment. Elevational regime, or hours of inundation per day, were assigned to each measured invader (Figures 39 through 47). The control plots were monitored as they had been.

224. Figures 39 through 43 depict the live stem densities for each measured invader over the elevational gradient during July 1977. *Panicum* sp., *Pluchea purpuracens* and *Acnida cannabina* were the

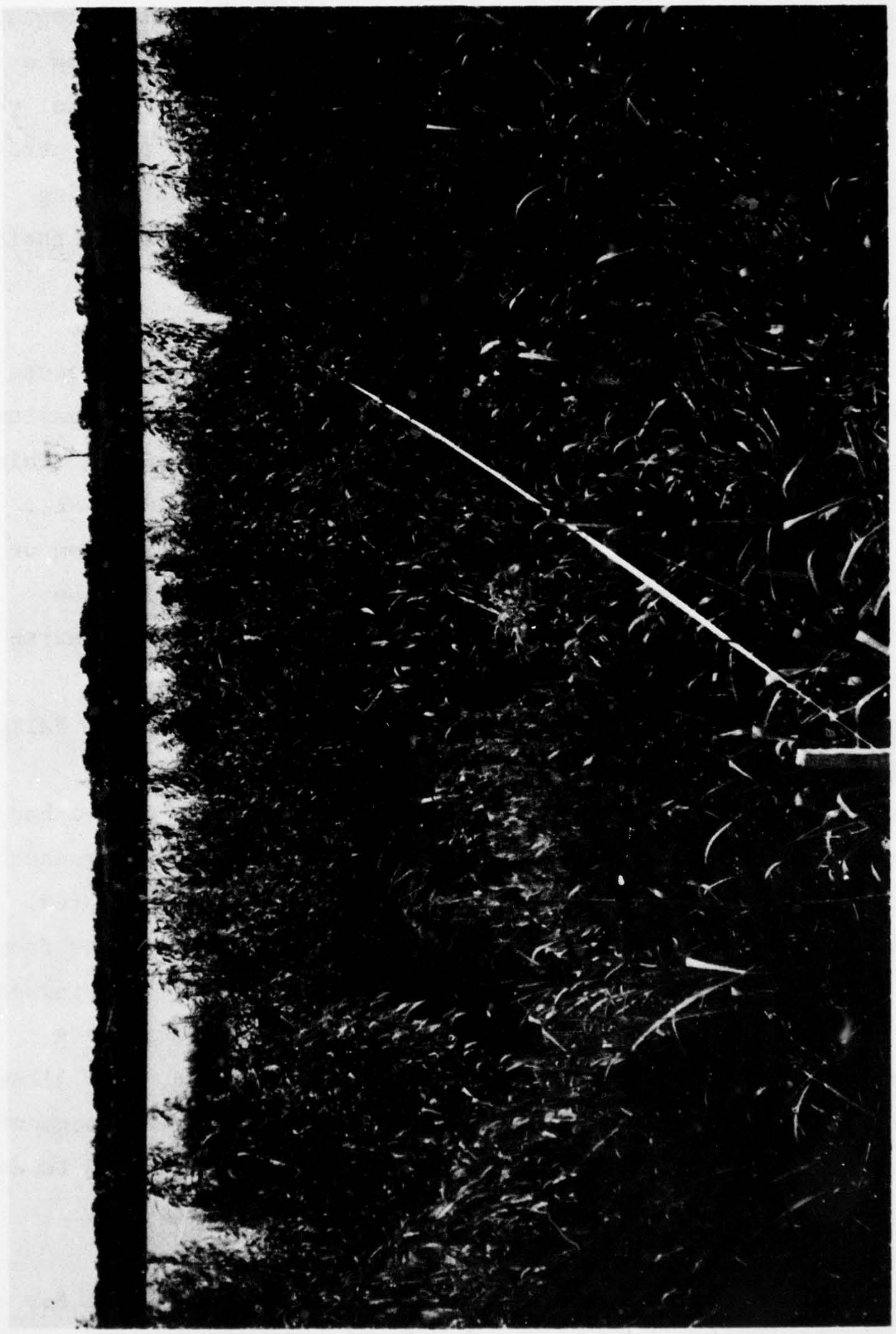

Figure 38. Transect line running from mean high water to mean low water. July 1977 transect used to determine invading species density.

AD-A062 867 GEORGIA UNIV BRUNSWICK MARINE EXTENSION SERVICE F/G 13/2
HABITAT DEVELOPMENT FIELD INVESTIGATIONS BUTTERMILK SOUND MARSH--ETC(U)
JUL 78 R J REIMOLD, M A HARDISKY, P C ADAMS DACW21-75-C-0074
UNCLASSIFIED WES-TR-D-78-26-APP-A NL

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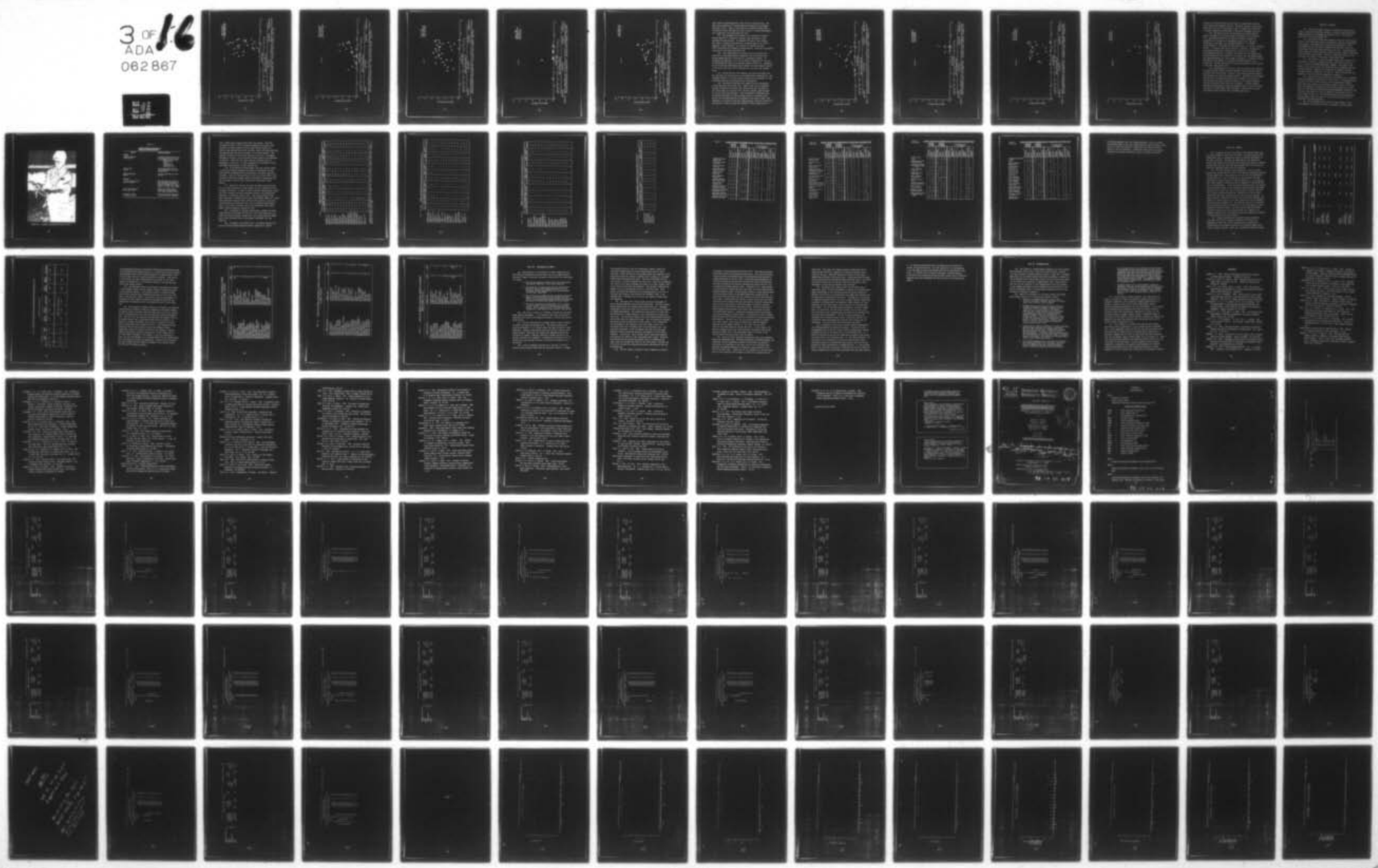

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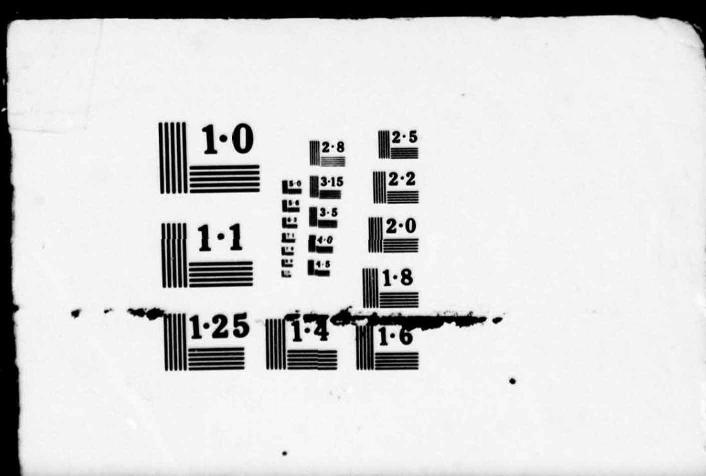

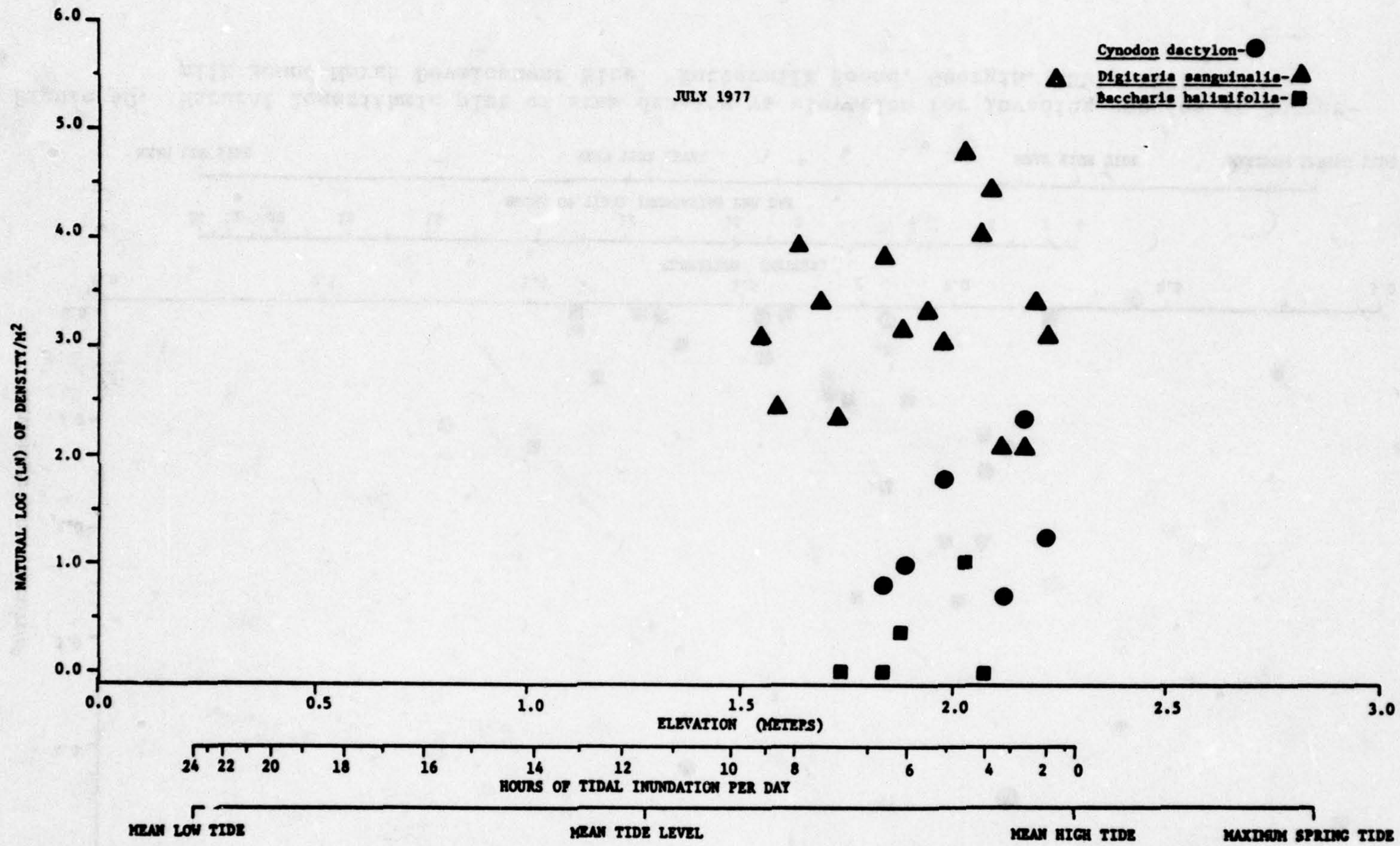

Figure 39. Natural logarithmic plot of stem density vs elevation for invading species at Buttermilk Sound Marsh Habitat Development Site, Buttermilk Sound, Georgia. July 1977.

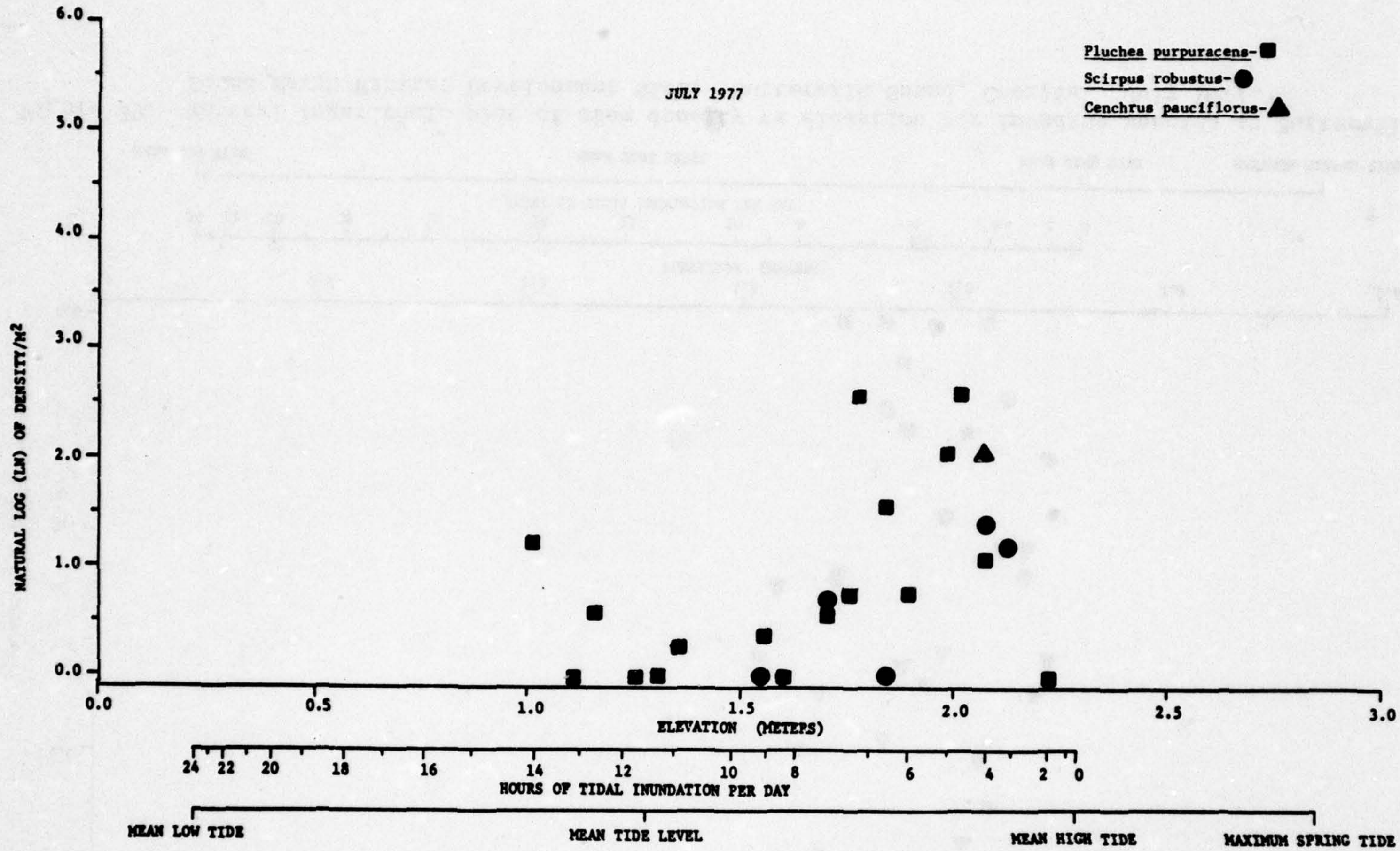

Figure 40. Natural logarithmic plot of stem density vs elevation for invading species at Buttermilk Sound Marsh Development Site. Buttermilk Sound, Georgia. July 1977.

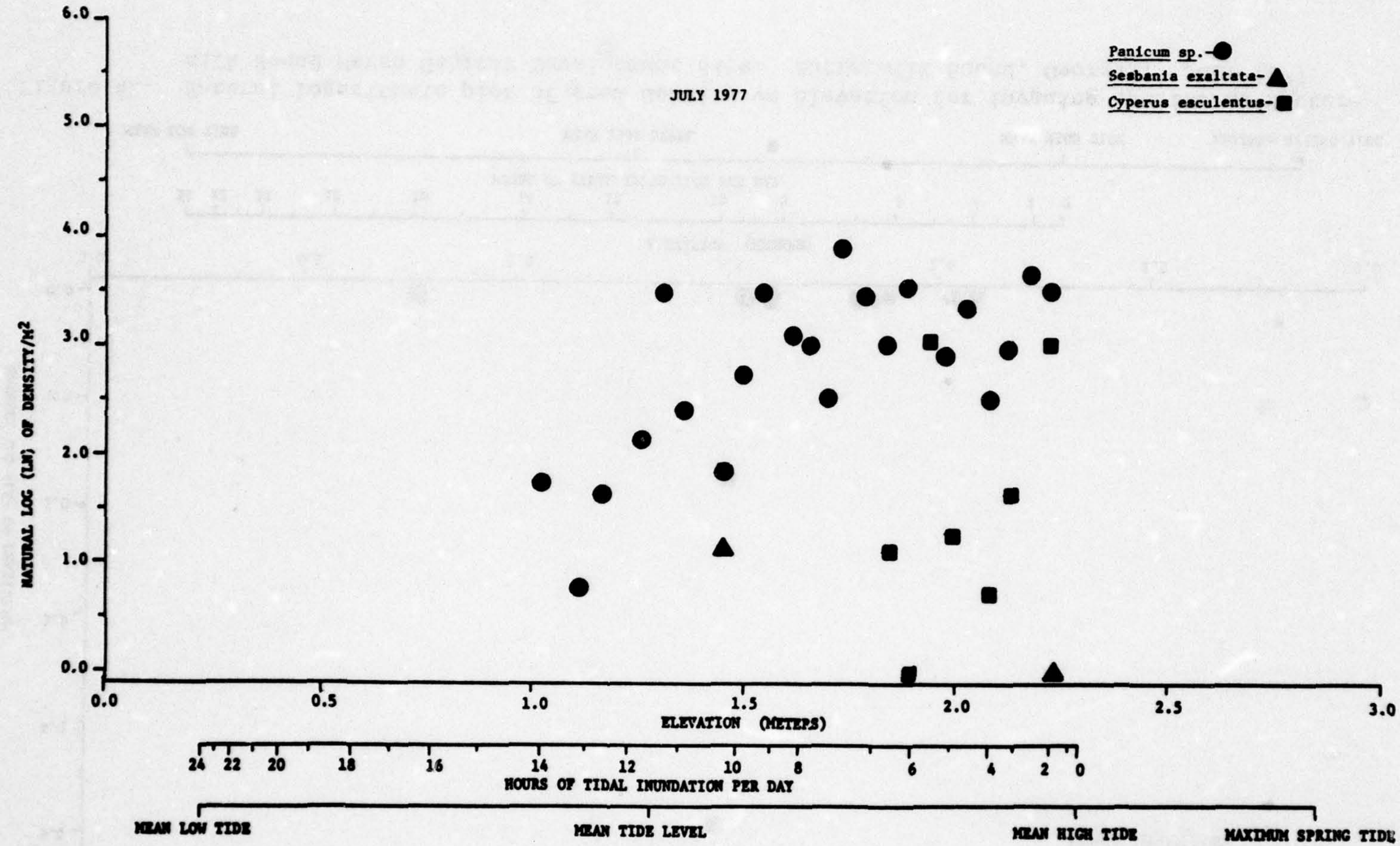

Figure 41. Natural logarithmic plot of stem density vs elevation for invading species at Buttermilk Sound Marsh Habitat Development Site. Buttermilk Sound, Georgia. July 1977.

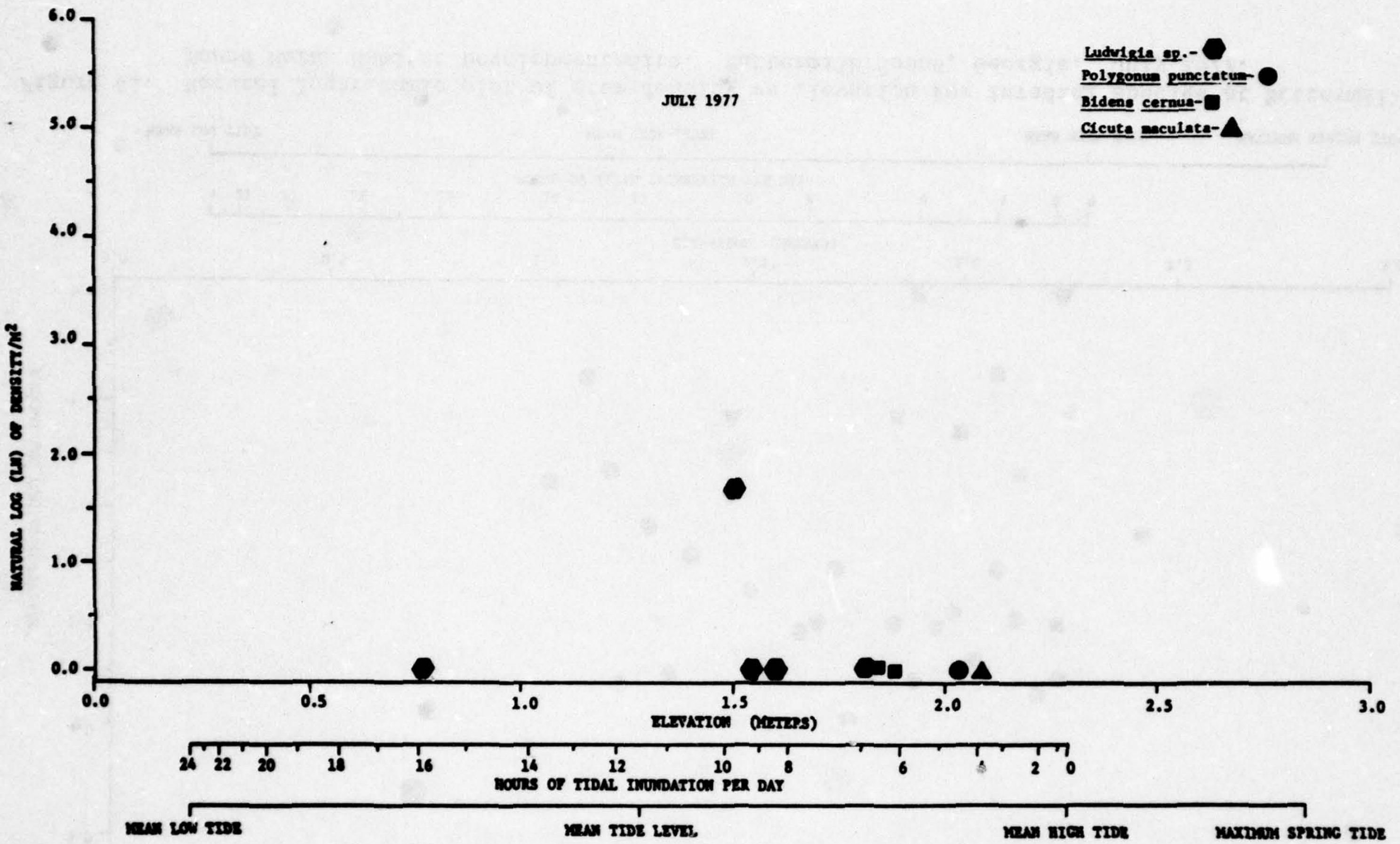

Figure 42. Natural logarithmic plot of stem density vs elevation for invading species at Buttermilk Sound Marsh Habitat Development Site. Buttermilk Sound, Georgia, July 1977.

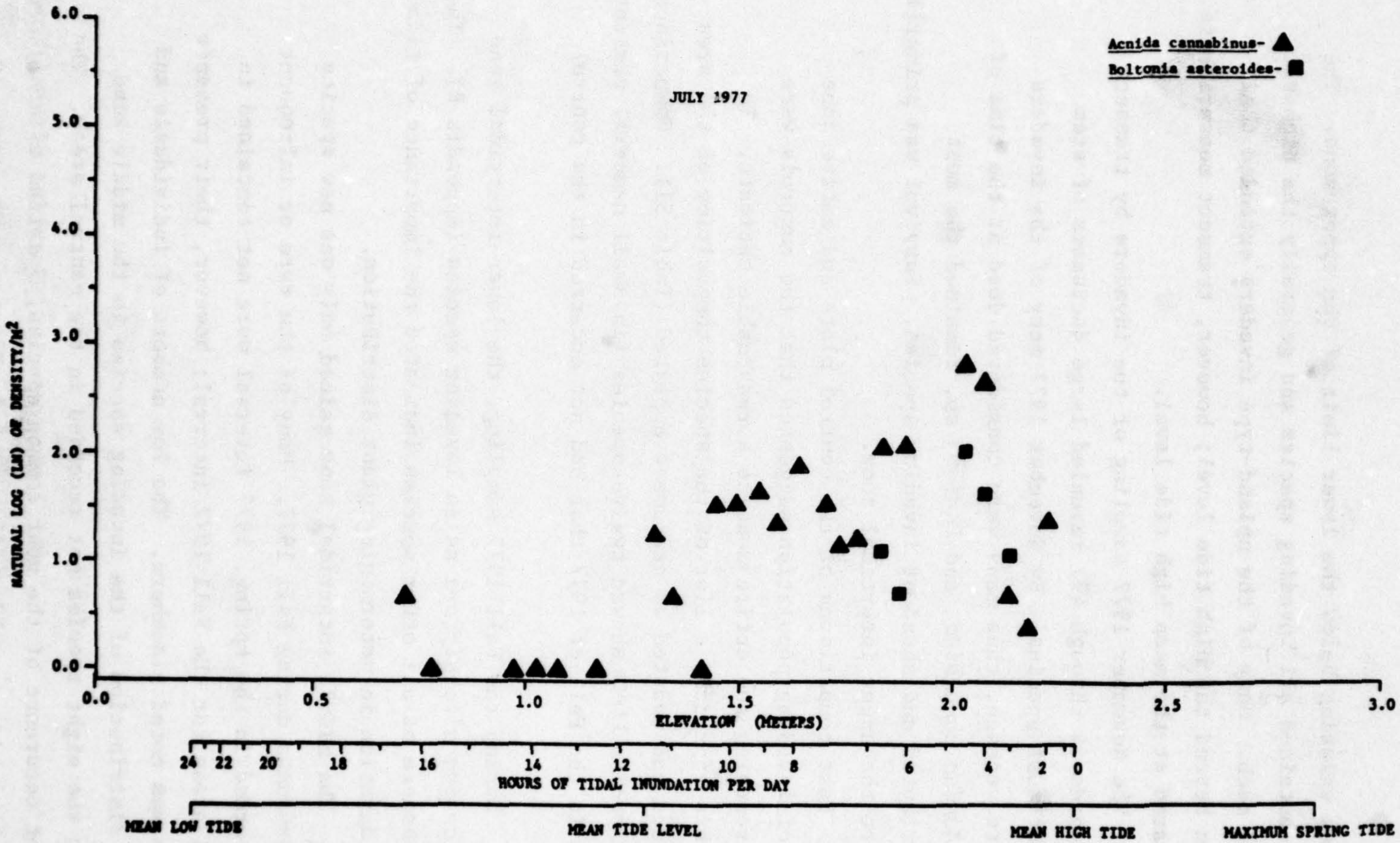

Figure 43. Natural logarithmic plot of stem density vs elevation for invading species at Buttermilk Sound Marsh Development Site. Buttermilk Sound, Georgia. July 1977.

major species existing below the lower limit of the upper zone. The upper zone contained all invading species and generally the highest densities of each. Many of the upland-type invaders extended their distribution beyond the high tide level; however, transect measurements were terminated at the mean high tide level.

225. The November 1977 sampling of the invaders by transect methods (Figures 44 through 47) revealed large decreases of stem densities for most species. By November 1977 many of the invaders had begun to senesce, thus many were considered dead at the time of sampling. *Acnida cannabina* and *Panicum* sp. remained the most widely distributed and abundant invading species. Survival was primarily restricted to the upper intertidal zone.

226. Past comparisons of the control plots and entire zone estimation of invading population suggested that the controls were quickly approaching the entire zone as a reasonable estimate. To safeguard this approach, a list of the species composition of the area was maintained and updated as newcomers appeared (Table 51). Comparison of the two species lists showed twelve species (in small numbers) present on the site in the Fall of 1977 that had not occurred in the control areas.

227. During the Fall 1977 sampling, the lower intertidal zone had only *Spartina alterniflora* as an invading species (Appendix H). The continued absence of all other species indicated the importance of tidal inundation duration in determining plant distribution.

228. The middle intertidal zone gained only one new species, *Scirpus americanus* during Fall 1977. Many of the rare or infrequent species recorded in the spring, 1977 interval were not contained in the control areas for the Fall 1977 interval; however, their presence on the site was noted elsewhere. The low numbers of individuals and the sparse distribution of the invading species in the middle zone account for the eight species not recorded in the control areas. The frequency of occurence of the most common species, *Spartina alterniflora* (36 percent), *Acnida cannabina* (21 percent), *Pluchea purpuracens* (9

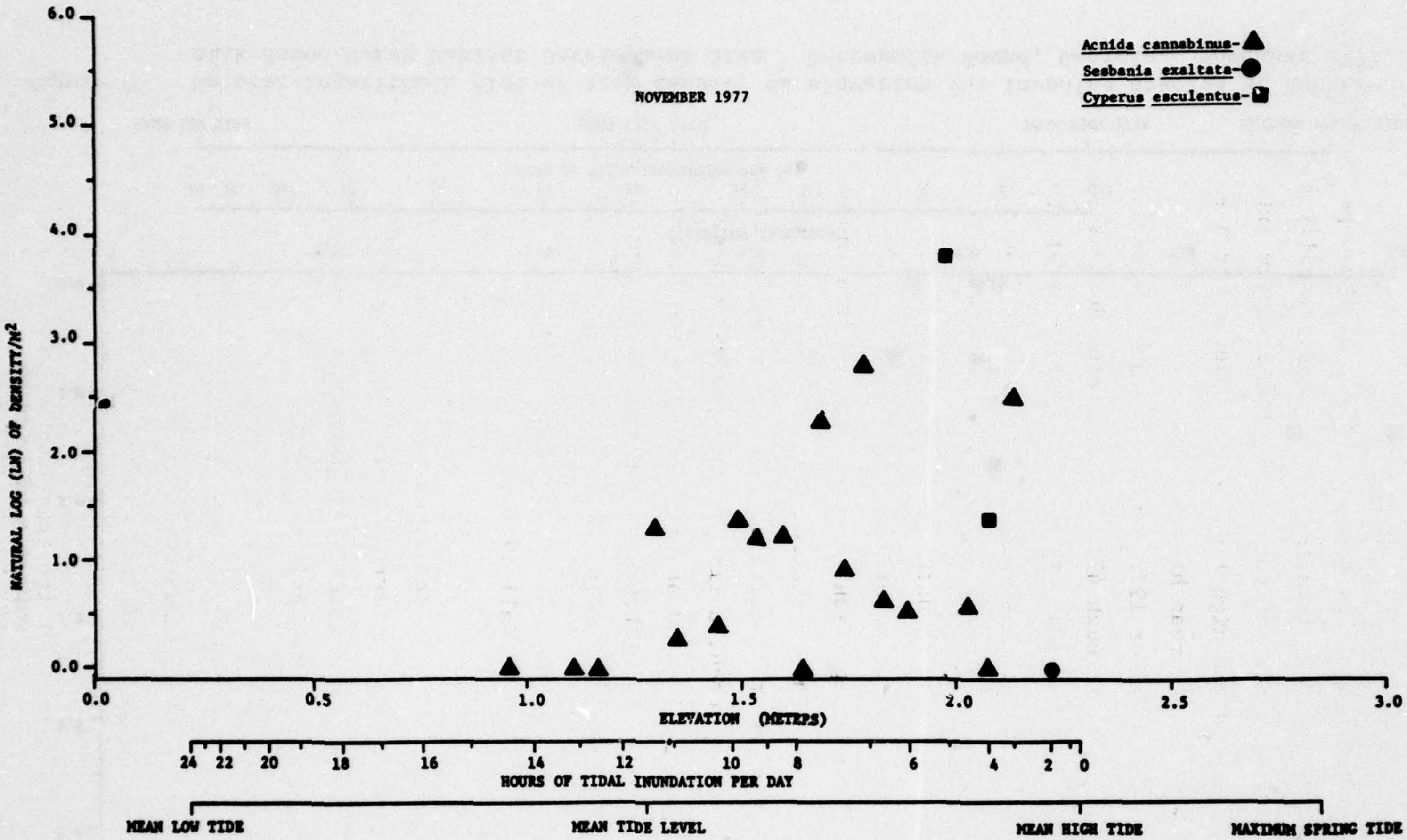

Figure 44. Natural logarithmic plot of stem density vs elevation for invading species at Buttermild Sound Habitat Development Site. Buttermilk Sound, Georgia. November 1977.

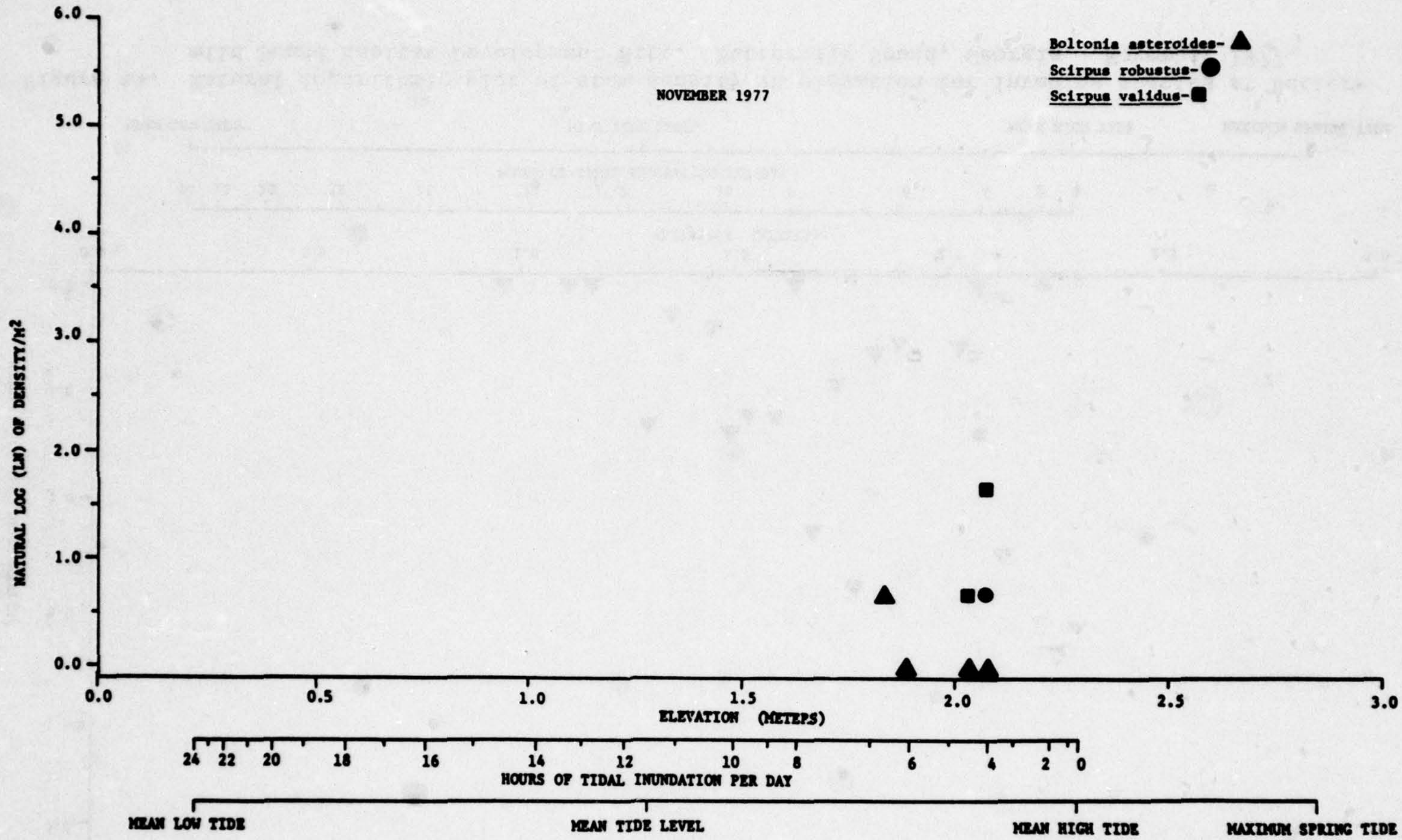

Figure 45. Natural logarithmic plot of stem density vs elevation for invading species at Buttermilk Sound Marsh habitat Development Site. Buttermilk Sound, Georgia. November 1977.

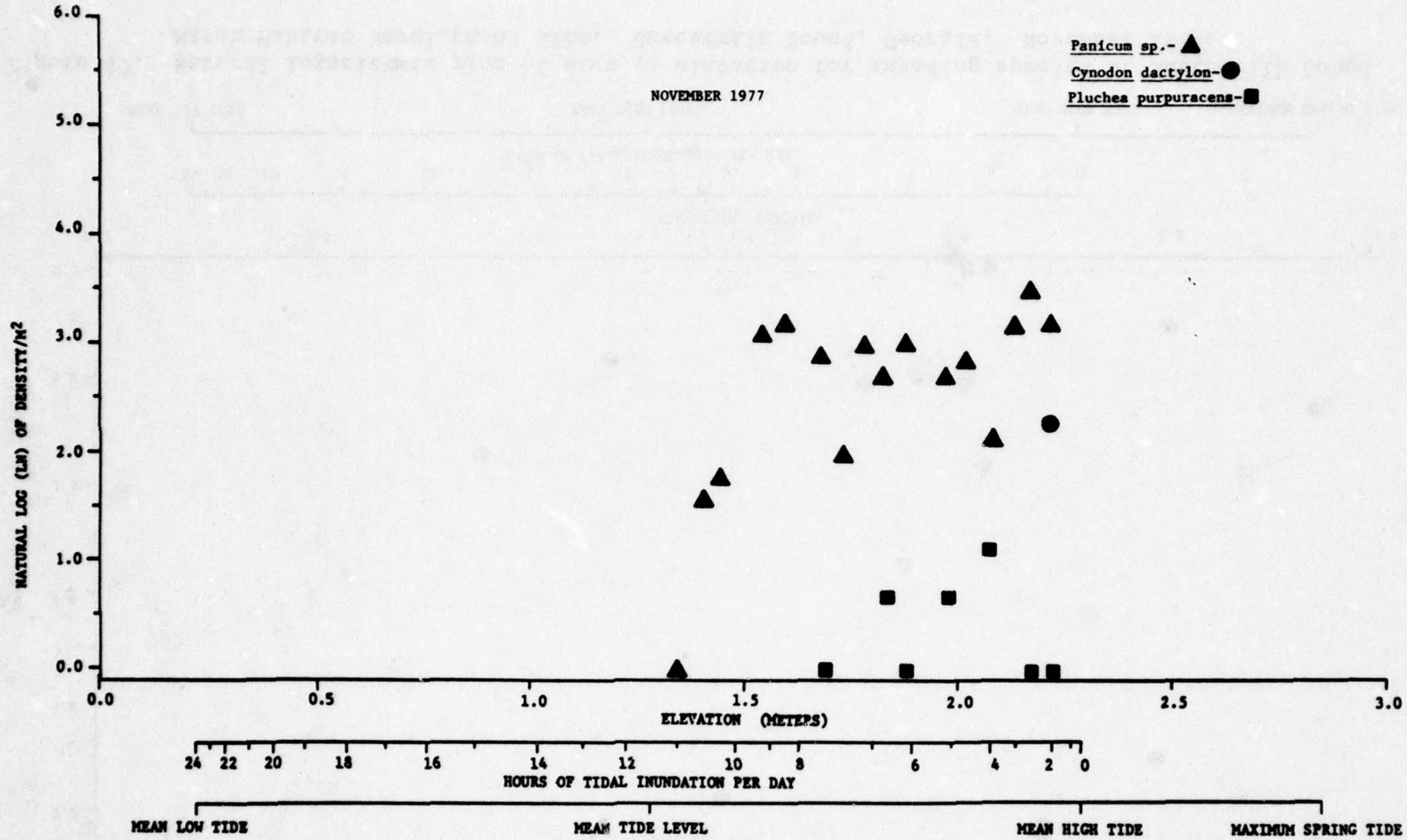

Figure 46. Natural logarithmic plot of stem density vs elevation for invading species at Buttermilk Sound Marsh Habitat Development Site. Buttermilk Sound, Georgia. November 1977.

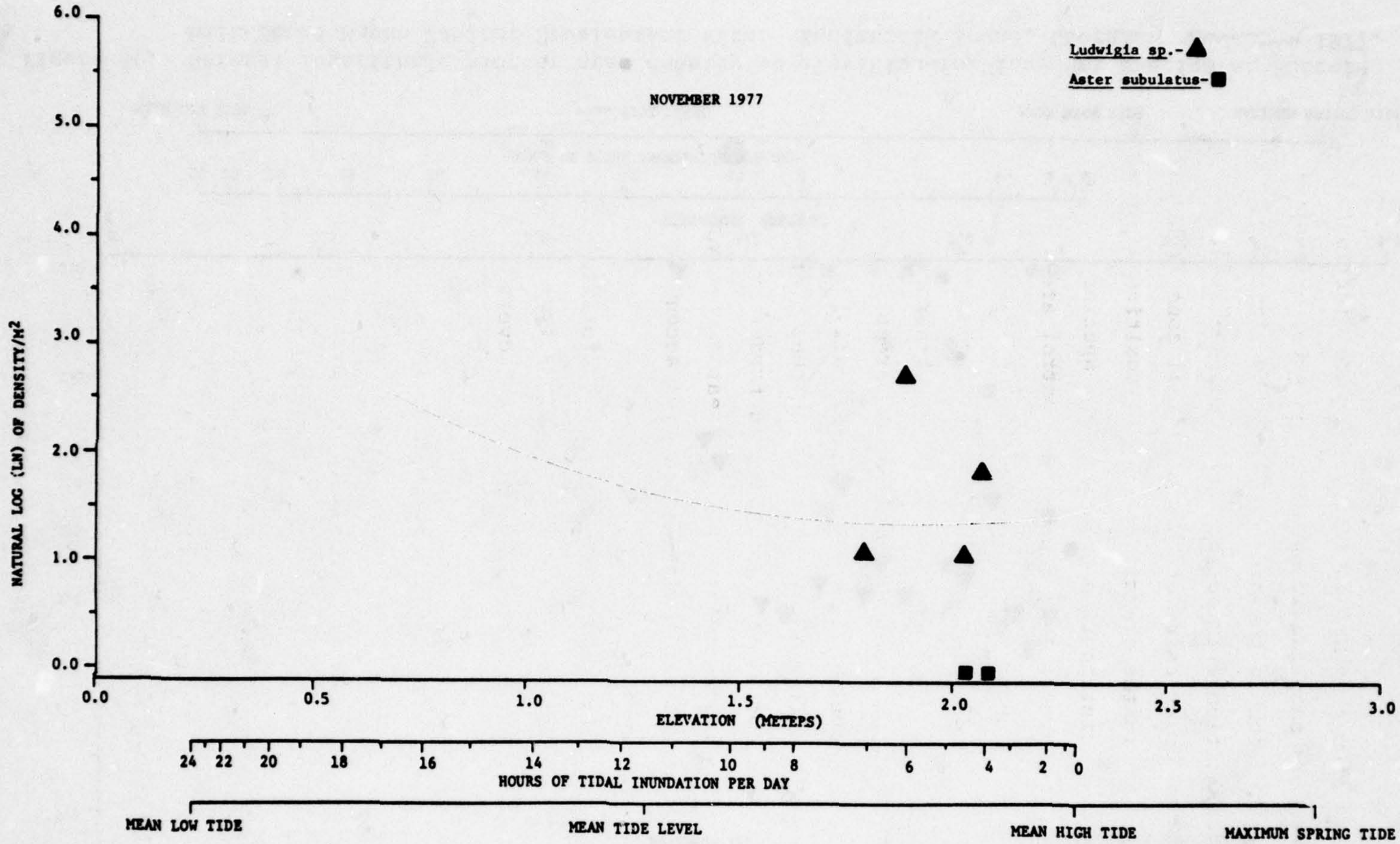

Figure 47. Natural logarithmic plot of stem vs elevation for invading species at Buttermilk Sound Marsh Habitat Development Site. Buttermilk Sound, Georgia. November 1977.

percent), and *Scirpus robustus* (5 percent) were distributed similarly to the Spring 1977 sampling interval. Twenty-two percent of the control areas had no invasion in the middle zones. No significant differences in species composition attributable to fertilizer treatment was noted.

229. The upper third of the intertidal zone lacked thirteen species contained in the overall species composition list during Fall 1977. The sparse distribution of these rare species reduced the possibility of occurence in a designated control area. The major inhabitants of the upper zone included *Panicum* sp. - 24 percent *Acnida cannabina* - 23 percent, *Pluchea purpuracens* - 13 percent, *Distichlis spicata* - 13 percent, and *Cynodon dactylon* - 5 percent. The percent of occurrence for *Panicum* sp. increased from 9 percent in the Spring 1977 sampling interval to 24 percent in the Fall 1977 and similarly for *Pluchea purpuracens* from 4 percent to 13 percent over one growing season. The remaining species had little change in frequency. Analysis of species distribution with respect to fertilizer treatment showed no real differences. Control areas without invasion accounted for only 2 percent of the total area by Fall 1977.

230. Consideration of the entire area for the Fall 1977 interval illustrated little change in invader frequency from the spring interval. The lower zone had less than 1 percent of the overall invasion pressure with 50 percent of the plots lacking invasion. The middle zone possessed 31 percent of all invasion pressure with no invasion in 22 percent of the area, while the upper zone had 68 percent of all invasion pressure with only 2 percent of the area free of invaders. Invasion pressure compared with intertidal elevation, documented the fact that few species were able to tolerate daily tidal inundation. Seeded plots were more susceptible to plant invasion than the transplanted plots.

PART XII: WILDLIFE

231. The most prevalent evidence of wildlife on the site was tracks created by the American alligator, (*Alligator mississippiensis*). Numerous alligators were using the planted plots for cover and the sandy banks for sunning (Figure 48).

232. Two other reptiles were observed on the site *Natrix sipedon fasciata*, the banded water snake, and *Malaclemys terrapin*, the diamond-back terrapin. The banded water snake was seen frequently in the surrounding area and two female terrapins were observed in June 1977 laying eggs in the sandy high ground above the site. It was interesting to note that the two most prevalent reptiles seen were commonly associated with fresh-water marsh systems. This was, undoubtedly, because of the extremely low salinity of the waters of Buttermilk Sound.

233. The tracks of only three mammal species were observed and identified on the site: *Oryzomys palustris*, marsh rice rat; *Procyon lotor*, raccoon; and *Ondatra zibethicus*, muskrat. The tracks of the marsh rice rat were the only ones observed with any regularity and were the most numerous. Comments on the reptiles and mammals utilizing Buttermilk Sound are summarized in Table 52. Times of observation and abundance for all wildlife are summarized in Appendix I.

234. Nesting and litter production were observed on a bi-monthly basis by checking each individual plot on the site. No nesting activity occurred on the site itself; however, *Rallus longirostris* (Clapper rail) nests were observed in the marshes located at either end of the site. The abundance of nesting on the site was related to the availability of the naturally established marshes immediately adjacent to the north and south ends of the site as opposed to the relative lack of cover on most of the site. This was also supported by observing birds such as clapper rails which feed on the site and then return to the established surrounding marshes.

235. The development of the site had a great impact on the avian community that utilized it prior to grading. Initial grading

Figure 48. Alligator captured the site in 1977.

TABLE 52.

RELATIVE ABUNDANCE OF REPTILES AND MAMMAL USE OF BUTTERMILK SOUND

Species	Relative Abundance
Mammals	
Oryzomys palustris Marsh Rice Rat	Tracks seen several times on site; two individuals observed on site on 4 November 1977 and 1 caught: -weight:67.2 gm -nose to base of tail length:12.0 cm -hind foot:2.9 cm.
Procyon lotor Raccoon	Tracks seen several times and one individual observed on site 7 January 1977
Ondatra zibethicus Muskrat	Tracks of individual seen 2 Febuary 1976
Reptiles	
Alligator mississippiensis American Alligator	Many individuals seen around the site and numerous tracks found on site; one individual caught and released 2 November 1977: approximately 1.2 m. long, 10 kg. weight
Natrix sipedon fasciata Banded water snake	Several seen in area and one caught and released 19 May 1977 71 cm. long, no weight recorded
Malaclemys terrapin Diamondback terrapin	Two individuals seen laying eggs on site, five and six eggs/nest.

left a large, gently sloping sandy beach type system. The birds utilizing the site in 1975, including sandpipers and plovers, were indicative of those commonly found on sandy beaches (Table 53). However, some species such as the swallows, rails, and wrens associated with marshes were also present because of the nearby marshes. The seasonal occurrence of each avian species on the site, its seasonal abundance in Georgia, and its preferred Georgia habitat are summarized in Table 54. Since only one blind study was conducted prior to development of the site, it cannot adequately be determined if site development significantly altered wildlife use.

236. As the marsh succession began, the avian species common to sandy beach habitat generally decreased or disappeared and the marsh species including sparrows, marsh hawks, and egrets generally increased. Since the lower one-third of the site (lower third of the intertidal elevational regime) remained essentially unvegetated, the site continued to attract some avian species preferring a sandy habitat.

237. Birds such as gulls and terns had historically used the site for resting purposes in large numbers and have continued to do so throughout the study. At times as many as several hundred gulls, terns, and oyster catchers have been documented sitting on the high ground adjacent to the habitat creation site. This was quantified by the high frequencies of observation and high total numbers (Table 53). Also, other enhancement features which attracted avian species to the site included poles and stakes which were used to delineate boundaries of plots. Such birds as ospreys, terns, and king-fishers which prefer higher perches frequently utilized the site.

238. In addition to wildlife observations, trapping to verify identification was initiated in the fall of 1977 when marsh rice rat tracks were first observed. Using metal live traps baited with peanut butter, one individual rice rat was caught in November 1977 (see Table 52).

239. In summary, the wildlife use of the habitat shifted from species preferring sandy substrate without vegetation to species

Table 53. **FREQUENCY, TOTAL NUMBER OBSERVED, AND RESIDENCY STATUS OF BIRDS OBSERVED ON SITE 1975-1977.**

	1975 - 1977			1975			1976			1977		
	Frequency*	Total No. Observed	Residency Status**	Number Observed	Residency Status	Frequency[1]	Number Observed	Residency Status	Frequency[2]	Number Observed	Residency Status	Frequency[3]
Hydroprogne caspia Caspian Tern	160.2	2243	C	212	C	53.0	867	FC	173.4	1164	FC	232.8
Thalasseus maximus Royal Tern	118.1	1653	FC	50	FC	12.5	396	FC	79.2	1207	FC	241.4
Corvus ossifragus Fish Crow	67.2	941	C	32	C	8.0	575	C	115.0	334	C	66.9
Larus delawarensis Ring-billed Gull	36.0	504	FC	2	FC	0.5	289	FC	57.8	213	FC	42.6
Crocethia alba Sanderling	19.8	277	FC	0	A	0.0	130	C	26.0	147	FC	29.4
Larus argentatus Herring Gull	18.9	264	FC	0	A	0.0	72	FC	14.4	192	FC	38.4
Cassidix mexicanus Boat-tailed Grackle	18.6	261	C	49	C	12.3	109	C	21.8	103	C	20.6
Larus atricilla Laughing Gull	14.8	207	FC	85	C	21.3	26	FC	5.2	96	U	19.2
Agelaius phoeniceus Red-Winged Blackbird	14.4	201	C	32	C	8.0	96	FC	19.2	73	FC	14.6
Charadrius semipalmatus Semipalmated Plover	11.1	156	FC	147	C	36.8	9	U	1.8	0	A	0.0
Haematopus palliatus American Oystercatcher	10.5	147	FC	6	U	1.5	79	FC	15.8	62	FC	12.4
Squatarola squatarola Black-bellied Plover	8.1	114	UNC	68	U	17.0	46	FC	9.2	0	A	0.0
Sterna forsteri Forster's Tern	7.0	98	UNC	15	U	3.8	1	U	0.2	82	FC	16.4
Calidris canutus Knot	4.7	66	UNC	0	A	0.0	48	FC	9.6	18	U	3.6
Rallus longirostris Clapper Rail	4.3	60	C	8	C	2.0	16	C	3.2	36	FC	7.2

* = Number of birds/days of observation based on 14 days of observations, [1] = Based on 4 observations, [2] = Based on 5 observations, [3] = Based on 6 observations, **C = Seen 75 - 100% of visits to site, FC = Seen 26 - 74% of visits to site, U = Seen less than 26% of visits to site, R = Rare; encountered only 1% of visits to site, A = Absent

Table 53. (Continued) **FREQUENCY, TOTAL NUMBER OBSERVED, AND RESIDENCY STATUS OF BIRDS OBSERVED ON SITE 1975-1977.**

	1975 - 1977			1975			1976			1977		
	Frequency*	Total No. Observed	Residency Status**	Number Observed	Residency Status	Frequency[1]	Number Observed	Residency Status	Frequency[2]	Number Observed	Residency Status	Frequency[3]
Ereunetes pusillas Semipalmated Sandpiper	3.4	48	R	0	A	0.0	48	U	9.6	0	A	0.0
Zenaidura macroura Mourning Dove	3.4	47	FC	4	FC	1.0	36	FC	7.2	7	FC	1.4
Pelecanus occidentalis Brown Pelican	3.1	44	FC	5	FC	1.3	1	U	0.2	38	FC	7.6
Leucophoyx thula Snowy Egret	2.9	40	C	2	U	0.5	14	C	2.8	24	C	4.8
Phalacrocorax auritis Double-Crested Cormorant	1.5	21	U	5	U	1.3	8	FC	1.6	8	U	1.6
Charadrius vociferus Kildeer	1.4	20	U	0	A	0.0	0	A	0.0	20	U	4.0
Iridoprocne bicolor Tree Swallow	1.4	19	U	7	U	1.8	0	A	0.0	12	U	2.4
Rhynchops nigra Black Skimmer	1.1	16	FC	4	FC	1.0	3	U	0.6	9	FC	1.8
Sterna hirundo Common Teru	1.1	15	U	7	U	1.8	0	A	0.0	8	U	1.6
Erolia alpina Dunlin	0.9	12	U	0	A	0.0	12	FC	2.4	0	A	0.0
Ammospiza maritima Seaside Sparrow	0.8	11	R	0	A	0.0	0	A	0.0	11	U	2.2
Nyctanassa violacea Yellow-Crowned Night Heron	0.7	10	U	0	A	0.0	3	U	0.6	7	FC	1.4
Sterna albifrons Least Tern	0.7	10	1	10	U	2.5	0	A	0.0	0	A	0.0
Casmerodius albus Common Egret	0.6	9	FC	0	A	0.0	4	FC	0.8	5	FC	1.0

Table 53. (Continued) **FREQUENCY, TOTAL NUMBER OBSERVED, AND RESIDENCY STATUS OF BIRDS OBSERVED ON SITE 1975-1977.**

	1975 - 1977			1975			1976			1977		
	Frequency*	Total No. Observed	Residency Status**	Number Observed	Residency Status	Frequency[1]	Number Observed	Residency Status	Frequency[2]	Number Observed	Residency Status	Frequency[3]
Fulica americana American Coot	0.4	5	R	0	A	0.0	5	U	1.0	0	A	0.0
Pandion haliaetus Osprey	0.4	5	FC	0	A	0.0	3	FC	0.6	2	FC	0.4
Ammospiza caudacuta Sharp-tailed Sparrow	0.3	4	R	0	A	0.0	0	A	0.0	4	U	0.8
Ardea herodias Great Blue Heron	0.3	4	U	1	U	0.3	1	U	0.2	2	U	0.4
Megaceryle alcyon Belted Kingfisher	0.3	4	U	0	A	0.0	4	FC	0.8	0	A	0.0
Telematodytes palustris Long-billed Marsh Wren	0.3	4	U	2	U	0.5	2	U	0.4	0	A	0.0
Cataptrophorus semi-palmatus Willit	0.3	4	3	4	C	1.0	0	A	0.0	0	A	0.0
Branta canadensis Canada Goose	0.2	3	R	0	A	0.0	3	U	0.6	0	A	0.0
Hirundo rustica Barn Swallow	0.2	3	R	3	U	0.8	0	A	0.0	0	A	0.0
Cathartes aura Turkey Vulture	0.1	2	R	0	A	0.0	2	U	0.4	0	A	0.0
Circus cyaneus Marsh Hawk	0.1	2	R	0	A	0.0	0	A	0.0	2	U	0.4
Erolia maritima Purple Sandpiper	0.1	2	R	0	A	0.0	2	U	0.5	0	A	0.0
Erolia minutilia Least Sandpiper	0.1	2	R	0	A	0.0	2	U	0.5	0	A	0.0
Falco columbarius Pigeon Hawk	0.1	2	R	0	A	0.0	1	U	0.2	1	U	0.2

Table 53. (Continued) **FREQUENCY, TOTAL NUMBER OBSERVED, AND RESIDENCY STATUS OF BIRDS OBSERVED ON SITE 1975-1977.**

	1975 - 1977			1975			1976			1977		
	Frequency*	Total No. Observed	Residency Status**	Number Observed	Residency Status	Frequency[1]	Number Observed	Residency Status	Frequency[2]	Number Observed	Residency Status	Frequency[3]
Lanius ludovicianus Loggerhead Shrike	0.1	2	R	0	A	0.0	0	A	0.0	2	U	0.4
Actitis macularia Spotted Sandpiper	0.1	1	R	0	A	0.0	1	U	0.2	0	A	0.0
Butorides virescens Green Heron	0.1	1	R	1	U	0.2	0	A	0.0	0	A	0.0
Coragyps atratus Black Vulture	0.1	1	R	1	U	0.2	0	A	0.0	0	A	0.0

Table 54. SEASONAL OCCURANCE AND PREFERRED HABITAT ON BIRDS SEEN ON BUTTERMILK SOUND

	Seasonal Occurance On Site			Seasonal Occurance In Georgia				Preferred Habitat In Georgia						
	Permanent	Summer	Winter	Permanent	Summer	Winter	Transient	Offshore	Beaches, Dunes Mudflats	Forests	Fields, Pastures	Freshwater marshes, ponds	Salt marshes	Estuaries, Sounds
Hydroprogne caspia Caspian Tern		X				X	X		X					X
Thalasseus maximus Royal Tern	X	X	X	X					X					X
Corvus ossifragus Fish crow	X	X	X	X					X	X	X	X	X	
Larus delawarensis Ring-billed Gull	X	X	X			X	X						X	X
Crocethia alba Sanderling	X	X	X		X	X	X		X					
Larus argentatus Herring Gull			X		X	X	X		X				X	X
Cassidix mexicanus Boat-tailed Grackle	X	X	X	X					X	X	X		X	
Larus atricilla Laughing Gull	X	X	X		X	X	X		X				X	X
Agelaius phoeniceus Red-winged Blackbird	X	X	X	X					X		X	X	X	
Charadrius semipalmatus Semipalmated Plover		X			X	X	X		X					
Haematopus palliatus American Oystercatcher	X	X	X	X					X					
Squatarola squatarola Black-bellied Plover		X			X	X	X		X					

Table 54. (Continued)

SEASONAL OCCURANCE AND PREFERRED HABITAT ON BIRDS SEEN ON BUTTERMILK SOUND

	Seasonal Occurance On Site			Seasonal Occurance In Georgia				Preferred Habitat In Georgia						
	Permanent	Summer	Winter	Permanent	Summer	Winter	Transient	Offshore	Beaches, Dunes Mudflats	Forests	Fields, Pastures	Freshwater marshes, ponds	Salt marshes	Estuaries, Sounds
Sterna foresteri Forster's Tern		X				X	X		X					
Calidris canutis Knot	X	X	X		X	X	X		X					
Rallus longirostris Clapper Rail	X	X	X	X									X	X
Ereuntes pusillus Semipalmated Sandpiper		X			X	X	X		X					
Zenaidurs macroura Mourning Dove		X		X							X			
Pelecanus occidentalis Brown Pelican	X	X	X	X										X
Leucophoyx thula Snowy Egret	X	X	X	X					X			X	X	X
Phalacrocorax auritis Double-Crested Cormorant	X	X	X		X	X								X
Charadrius vociferus Kildeer		X			X	X			X		X			
Iridoprocne bicolor Tree Swallow		X	X			X	X					X	X	
Rhynchops nigra Black Skimmer		X		X					X					X
Sterna hirundo Common Tern		X					X		X					X

Table 54. (Continued) **SEASONAL OCCURANCE AND PREFERRED HABITAT ON BIRDS SEEN ON BUTTERMILK SOUND**

	Seasonal Occurance On Site			Seasonal Occurance In Georgia				Preferred Habitat In Georgia						
	Permanent	Summer	Winter	Permanent	Summer	Winter	Transient	Offshore	Beaches, Dunes Mudflats	Forests	Fields, Pastures	Freshwater marshes, ponds	Salt marshes	Estuaries, Sounds
Erolia alpina Dunlin		X				X	X		X					
Ammospiza maritima Seaside Sparrow			X	X									X	
Nyctanassa violacea Yellow-Crowned Night Heron		X			X	X						X	X	X
Sterna albifrons Least Tern		X			X				X					X
Casmerodius albus Common Egret	X	X		X					X			X	X	X
Fulica americana American Coot			X		X	X	X					X		X
Pandion haliaetus Osprey		X	X		X							X		X
Ammospiza caudacuta Sharp-tailed Sparrow			X			X							X	
Ardea herodias Great Blue Heron	X	X	X	X					X				X	X
Megaceryle alcyon Belted Kingfisher	X	X	X	X								X		X
Telmatodytes palustris Long-Billed Marsh Wren	X	X	X	X								X	X	

Table 54. (Continued)

SEASONAL OCCURANCE AND PREFERRED HABITAT ON BIRDS SEEN ON BUTTERMILK SOUND

	Seasonal Occurance On Site			Seasonal Occurance In Georgia				Preferred Habitat In Georgia						
	Permanent	Summer	Winter	Permanent	Summer	Winter	Transient	Offshore	Beaches, Dunes Mudflats	Forests	Fields, Pastures	Freshwater marshes, ponds	Salt marshes	Estuaries, Sounds
Cataptrophorus semipalmatus Willit	X	X	X	X					X				X	
Branta Canadensis Canada Goose			X			X	X				X	X		
Hirundo rustica Barn Swallow		X					X					X	X	
Cathartes aura Turkey Vulture		X		X					X	X	X			
Circus cyaneus Marsh Hawk			X			X					X	X	X	
Erolia maritima Purple Sandpiper		X				X								
Erolia minutilla Least Sandpiper		X			X	X	X		X					
Falco columbarius Pigeon Hawk			X			X	X		X		X			
Lanius ludovicianus Loggerhead Shrike		X		X							X			
Actitis macularia Spotted Sandpiper		X				X	X		X					
Butorides virescens Green Heron		X			X							X	X	X
Coragyps atratus Black Vulture			X	X					X	X	X			

preferring vegetated cover and a marsh substrate. Due to the early successional stage of the newly forming marsh at the conclusion of this study, it would be premature to assume that other wildlife species would not use the new habitat. Additional observations over time are essential to ascertain the habitat value to a variety of wildlife.

PART XIII: NEKTON

240. Sampling for nekton surrounding the Buttermilk Sound site was conducted with an otter trawl and seine. The nekton sampling was conducted in order to determine the effect of habitat development on the nekton presence. Although the comparisons of the communities include both seining and trawl data, the seining data cannot be compared statistically with the trawl data since neither gear nor distance nor time were compatible between the two techniques.

241. All the diversity indices computed for both the Duplin Estuary (the control estuary, a part of the National Estuarine Sanctuary) and Buttermilk Sound, were similar for the 1976 and 1977 observation periods (Table 55). All the diversity indices revealed that both populations of nekton tend to be slightly skewed, i.e., a few species had a large number of individuals and the remainder of the species had only a few individuals. In the Duplin Estuarine Sanctuary (the control) and in Buttermilk Sound, the more abundant species included the common anchovy (*Anchoa mitchilli*), and the white shrimp (*Penaeus setiferus*). The J index of diversity depicted the communities to be more evenly distributed than their representation by other diversity indices. It should be kept in mind that this index was particularly dependent upon sample size, while several of the other indices were not so dependent upon variations in sample size. The diversity indices for the Buttermilk Sound seining data were skewed due to the large number of grass shrimp (*Palaeomonetes pugio*). The data from the Duplin Estuarine Sanctuary (control) and the Buttermilk Sound area revealed a low dominance indicating that no singular species was competing for habitat to the exclusion of all other species.

242. Percent similarity and Euclidean distance parameters (Whittaker 1975) for the community analysis of the nekton are summarized in Table 56. Percent similarity was a quantitative representation of the degree to which the two samples compared were alike in terms of species. There was a reasonable similarity between

Table 55. SPECIES DIVERSITY INDICES COMPUTED FOR BUTTERMILK SOUND TRAWL AND SEINE DATA AND DUPLIN ESTUARY TRAWL DATA, 1976-1977

	Number of Species	Number of Individuals	H BAR	J	NM INDEX	D	DOMINANCE
				1976			
Duplin Estuary	19	536	1.99	0.69	0.25	2.71	0.1984
Buttermilk Sound (Trawl)	17	211	1.93	0.68	0.21	2.99	0.2258
Buttermilk Sound (Seine)	12	3101	0.53	0.21	0.04	1.37	0.7731
				1977			
Duplin Estuary	12	80	1.51	0.61	0.16	2.51	0.3595
Buttermilk Sound (Trawl)	24	595	1.62	0.51	0.13	3.60	0.3910
Buttermilk Sound (Seine)	18	2541	0.72	0.25	0.05	2.17	0.7120

TABLE 56. COMPARISON OF PERCENT SIMILARITIES AND EUCLIDEAN DISTANCES FOR EACH SET OF DATA 1976 - 1977.

1976 vs 1977			1976			1977		
Duplin	Buttermilk Sound Trawl	Buttermilk Sound Seine	Duplin vs Buttermilk Sound Trawl	Duplin vs Buttermilk Sound Seine	Buttermilk Sound Trawl vs Seine	Duplin vs Buttermilk Sound Trawl	Duplin vs. Buttermilk Sound Seine	Buttermilk Sound Trawl vs Seine
PERCENT SIMILARITY								
0.4755	0.6984	0.9172	0.6970	0.0052	0.0150	0.2551	0.1381	0.0651
EUCLIDEAN DISTANCE								
0.3180	0.1849	0.0454	0.1279	0.6959	0.7050	0.5306	0.6831	0.7192

the trawling data (69 percent similarity), and the seining data showed the similarity between the two years (91 percent). In 1976 the Duplin control estuary and Buttermilk Sound had 69 percent similarity of species while in 1977 the two areas only had 25 percent similarity of species. This was due to the extreme cold water temperatures of the winter of 1977 which caused an excessive kill of the nektonic species in the shallow water areas along coastal Georgia.

243. The Euclidean distance was a means of expressing the degree to which samples differ from one another in species composition along an environmental gradient. The greatest spread or distance between data sets was revealed when comparisons were made of any of the trawl data to the seine data results. The winter of 1977 was instrumental in creating the large disparity between the distances by which the two communities were separated in 1977 contrasted with that of 1976 (Table 56).

244. The ecological community similarity, diversity, and dominance considerations revealed that there were significant variations between the nekton found in the Duplin Estuarine Sanctuary (the control estuary) and the surrounding waters of the Buttermilk Sound habitat development site. The fact that the similarity and dominance was somewhat lower in the Duplin Estuary than in Buttermilk Sound could be related to the physically stressed environment (low salinity, extremely cold water) found in Buttermilk Sound during winter 1977. Since numerous factors including niche size and overlap, natural environmental stress, competition, space and atrophic structure of the community, regulate community similarity, and since the habitat was such a small part of the total habitat available to the nekton, it was not surprising to learn that the establishment of a new marsh habitat did not significantly alter the nektonic diversity and similarity. Tables 57 and 59 iterate the nekton sampled and the numerical abundance of the species during the 1976 and 1977 sampling periods.

TABLE 57. SPECIES AND NUMBER OF INDIVIDUALS CAPTURED IN DUPLIN ESTUARY BY TRAWL, 1976-1977

Genus, Species	Common name	1976	1977
Anchoa mitchilli	Common anchovy	134	49
Arius felis	Sea catfish	12	0
Bagre marinus	Gafftopsail catfish	4	0
Bairdiella chrysura	Silver perch	3	0
Brevoortia tyrannus	Atlantic menhaden	4	1
Callinectes sapidus	Blue crab	5	0
Chloroscombrus chrysurus	Atlantic bumper	25	3
Clupea harengus	Atlantic herring	0	1
Cynoscion regalis	Weakfish	28	0
Dasyatis americana	Southern stingray	1	0
Leiostomus xanthurus	Spot	13	2
Lepisosteus osseus	Longnose gar	0	1
Loligo brevirostrum	Squid	11	4
Menidia menidia	Atlantic silverside	0	3
Menticirrhus americanus	Southern kingfish	1	0
Micropogon undulatus	Atlantic croaker	17	0
Opsanus tau	Oyster toadfish	1	0
Palaemonetes pugio	Grass shrimp	0	6
Penaeus aztecus	Brown shrimp	21	0
Penaeus setiferus	White shrimp	181	6
Stellifer lanceolatus	Star drum	69	3
Symphurus plagiusa	Blackcheek touguefish	5	1
Trinectes maculatus	Hogchoker	1	0

TABLE 58. SPECIES AND NUMBER OF INDIVIDUALS CAPTURED IN BUTTERMILK SOUND BY TRAWL, 1976-1977

Genus, Species	Common name	1976	1977
Alosa aestivalis	Blueback herring	0	1
Anchoa mitchilli	Common anchovy	41	43
Arius felis	Sea catfish	1	2
Bagre marinus	Gafftopsail catfish	0	11
Bairdiella chrysura	Silver perch	1	2
Brevoortia tyrannus	Atlantic menhaden	3	5
Callinectes sapidus	Blue crab	1	3
Caranx latus	Horse-eyed jack	0	1
Chloroscombrus chrysurus	Atlantic bumper	1	1
Clupea harengus	Atlantic herring	3	4
Cynoscion regalis	Weakfish	8	24
Etropus crossotus	Fringed flounder	0	1
Ictalurus catus	White catfish	10	21
Ictalurus punctatus	Channel catfish	0	21
Leiostomus xanthurus	Spot	9	38
Lepisosteus osseus	Longnose gar	0	5
Loligo brevirostrum	Squid	0	1
Menticirrhus americanus	Southern kingfish	1	2
Micropogon undulatus	Atlantic croaker	27	31
Mugil cephalus	Striped mullet	2	1
Palaemonetes pugio	Grass shrimp	0	10
Penaeus setiferus	White shrimp	85	364
Pomatomus saltatrix	Bluefish	1	0
Stellifer lanceolatus	Star drum	9	12
Trinectes maculatus	Hogchoker	8	1

TABLE 59. SPECIES AND NUMBER OF INDIVIDUALS CAPTURED IN BUTTERMILK SOUND BY SEINE, 1976-1977

Genus, Species	Common name	1976	1977
Alosa aestivalis	Blueback herring	3	0
Anchoa mitchilli	Common anchovy	0	4
Bairdiella chrysura	Silver perch	0	1
Brevoortia tyrannus	Atlantic menhaden	1	53
Callinectes sapidus	Blue crab	1	1
Caranx latus	Horse-eyed jack	0	3
Clupea harengus	Atlantic herring	1	0
Cynoscion regalis	Weakfish	0	1
Eucinostomus gula	Silver jenny	6	3
Fundulus heteroclitus	Mummichog	40	15
Gobionellus shufeldti	Freshwater goby	26	3
Leiostomus xanthurus	Spot	1	1
Menidia menidia	Atlantic silversides	42	19
Mugil cephalus	Striped mullet	253	139
Palaeamonetes pugio	Grass shrimp	2714	2136
Paralichthys dentatus	Summer flounder	0	1
Penaeus setiferus	White shrimp	13	82
Oligoplites saurus	Leatherjacket	0	4
Opisthonema oglinum	Atlantic thread herring	0	74
Strongylura marinus	Needlefish	0	1

PART XIV: COMPREHENSIVE SUMMARY

245. Marsh habitat can be developed on sandy dredged material. The artificial propagation of marsh plants onto the dredged material initiated a number of positive processes contributing to the development of a marsh.

1) The planted vegetation slowed tidal waters and caused accelerated deposition of particulate material.

2) The deposition of particulate material fostered the growth of the microbial populations which in turn increased nutrient availability and increased growth of the plant communities.

3) The thick root mat formed by the coalescing of planted species and volunteering species provided excellent erosion control during the growing season and encouraged accretion of blowing sands during the winter months.

4) The plant communities provided habitat for a variety of avian species as well as feeding areas for small fishes. As the vegetation died, the dead plant parts contributed to the detritus food supply of the estuary.

246. There were a variety of techniques necessary for successful marsh habitat development. It is important that these techniques be integrated with natural environmental processes to achieve the desired marsh habitat.

247. The site initially was a dredged material island composed of coarse sand from the Altamaha river. The dredged material was leveled and graded to a 3.7 percent slope from mean low water to mean high water. Sprigs of seven marsh plant species were collected from nearby marshes. Efficiency and economy were emphasized during the collection of sprigs. Singular culms with a modest portion of root material typified the transplants. Transplants were planted on 0.5 m^2 centers into plots having a variety of fertilizer treatments or no fertilizer.

248. Initial transplant survival was a function of the hot weather during planting (June 1975) and transplant quality. A higher

than expected mortality rate was encountered, however, within the elevational regime preferred by each species good survival rates prevailed. Growth during the first growing season was primarily tiller production around the original transplant and no evidence of increased growth from fertilization was noted. *Spartina alterniflora* was the only species to produce seedheads the first year. Some silt accumulation as a result of the gently sloping area began on the site, however, most of the fines filtered into the substrate. The microbial community was similar to that of preplanting for most of the first year. Water quality determinations described the surrounding waters to be rich in nutrients and primarily controlled by the freshwater input of the Altamaha River. Wildlife use of the site was limited to shore birds and alligators.

249. The second year (1976) brought continued development of plant, macroinvertebrate, and microbial populations. The plant species spread rapidly from the original sprigs during this year. Extensive development of both aerial and root portions of the the plant was reflected in biomass measurements. The seeded plots were planted in April 1976 and developed in a similar manner to the transplanted area during the first year. The elevational range in which each seeded species survived was narrower than the transplanted range. The crab population followed dense plant growth irrespective of plant species. Silt accumulation was accelerated by the vegetative cover and formed a one to two centimetre layer over the middle third of the intertidal zone. The continued integration of silt and organic particles with the sandy substrate fostered increased diversity and biomass of the microbial community. Interstitial water nutrient levels experienced seasonal fluctuations very similar to the surrounding water column. Generally the interstitial water maintained higher levels of phosphorus and lower levels of nitrogen than those of the tidal waters. Wildlife use of the area included more species preferring a marsh habitat than the preceeding year.

250. The most dramatic changes in biotic community and abiotic

environment occurred during the third year (1977). Plant species excelled within their particular optimum elevational range. Aerial and root biomass production of most transplanted areas and some seeded areas approached the ranges documented for natural areas. All species produced seedheads and continued to spread and coalesce over the upper third of the intertidal zone. *Spartina alterniflora* and several invading plant species were the sole occupants of the middle and lower zones. Siltation of up to eight centimetres occurred in the middle and lower zones of the site while the upper zone remained primarily sandy. Cation exchange capacity, organic matter content, and total nutrient levels all increased substanially during this year. A reduction in redox potential was also evident in the middle and lower intertidal areas. Interstitial water nutrient content varied with soil types associated with each intertidal zone, but showed no variation between vegetated areas of each species. Microbial biomass continued to increase, however, was still much less than natural areas. Invasion pressure was high during this year as nearly every barren area in the upper zone was colonized by plant species. Competition among experimental and invading plant species showed no adverse effects to experimental species, however, *Spartina patens* and *Distichlis spicata* successfully excluded many invading plant species. Wildlife use of the site shifted primarily to marsh type avian species with shore and beach avian species utilizing the lower (still sandy) portions of the site and the sandy crown of the island above the spring tide level. Little change in the nektonic community was noted over the 2.5 year experimental period suggesting the small size of the development marsh in relation to the entire estuary had little effect upon the nekton.

251. By far the most important environmental factor was elevation within the intertidal zone. *Borrichia frutescens, Distichlis spicata, Iva frutescens, Juncus roemenianus, Spartina cynosuroides*, and *Spartina patens* were all restricted to the upper third of the intertidal zone. *Spartina alterniflora* dominated the middle and upper portions of the lower intertidal zone. A sandy aerobic soil persisted in the upper zone while a silty anaerobic soil (similar to marsh soil) developed in the

middle zone. The lower zone remained largely unvegetated and the migrating sandy substrate resembled the alluvial sediments used to construct the site. Microbial communities similar to salt marsh communities developed in the middle zone. Interstitial water nutrient levels experienced some differences among intertidal zones. All biotic and abiotic factors were in some way related to elevation or were responding to other factors dependent upon elevation.

252. The results also revealed that the fertilizer had no significant effects on the establishment of growth of the marsh plants. Careful monitoring of the surrounding estuarine waters revealed an absence of any effects of eutrophication that might have resulted from the application of additional fertilizers. Although all of the areas of vegetation appeared within two years to support similar fiddler and squareback crab populations, the presence of ribbed mussels and other indicators of the climax stages in the succession of the marsh were still absent. Of all the plant species evaluated, the woody stemmed plant, *Iva frutescens*, was the least successful due in part to the fact that many of the transplants were excavated by the flooding tide soon after being transplanted. The use of seeds appeared to be reasonable for all species except *Juncus roemerianus*, however, the elevational range representing good survival was narrower than for transplants. No *Juncus* plants were established from seeds.

253. Integrating all the plant and environmental measurements, the following general conclusions were drawn: 1) *Spartina patens* (transplanted) and *Distichlis spicata* (either transplanted or seeded) performed the best in the upper third of the intertidal zone. 2) *Spartina alterniflora* was the only significant occupant of the middle and lower third of the intertidal zone. 3) *Borrichia frutescens*, *Iva frutescens*, *Juncus roemerianus*, and *Spartina cynosuroides*, while providing diversity to the maturing marsh habitat, were not the best species for rapid stabilization of dredged material. 4) The development of soil types was a function of elevation and the soils that did develop resembled the natural soils associated with each plant species.

5) The vegetated dredged material encouraged rapid colonization by fiddler and squareback crabs. The time required for the colonization of the new marsh by snails and mussels could not be determined by this study. 6) Wildlife use, microbial development, invasion pressure, interstitial water nutrients and plant mineral content were all directly dependent upon soil development and plant success at each elevational regime.

PART XV: RECOMMENDATIONS

254. The creation of a marsh habitat appears to be quite possible. With relatively little effort, and with low skilled labor, a habitat site can be planted if proper planning precedes. Using labor at minimum wage rates, and one highly skilled experienced supervisor, transplants can be obtained from a nearby marsh, and an acre of brackish water marsh can be planted with vegetation in approximately 200 to 250 man hours. The cost for the excavation of the dredged material and its placement at the suitable intertidal elevation depends upon the proximity of the habitat development areas to the maintenance dredging project and the proximity of available transplants.

255. Specific requirements for successful habitat development using dredged material in a brackish water habitat include:

a. Position all dredged material so that it has a resultant elevation from mean tide level to spring level, and a slope of 1:25 or greater.

b. Dredged material should be deposited so that consolidation adequate to support a human has taken place prior to the initiation of the habitat creation (exact times required can be ascertained from companion studies of the Dredged Material Research Program evaluating consolidation of dredged material). The project should be planned so that the propagules can be transplanted in the months of January through April along the south Atlantic and Gulf coast, and March through May along the mid Atlantic coast.

c. Considering the greater flexibility of field procedures and the slight advantage of success, transplants should be favored over seed. Transplants collected and transplanted the same day should be utilized wherever possible. Individual culms should be selected for transplanting and care should be taken to minimize damage to the roots. Culms with stout rhizomes should also be selected whenever possible.

d. The planned transplantation of *Spartina alterniflora* into the middle third of the intertidal zone (8-16 hours of inundation per day), and the transplantation of *Spartina patens* and *Distichlis spicata*

into the upper third of the intertidal zone (0-8 hours of inundation per day) would provide the best species combination for rapid stabilization of dredged materials. Additional planting of the other experimental species within the upper zone would increase plant diversity and foster the future development of a marsh ecosystem which resembles natural areas. The vegetated dredged material will encourage rapid colonization by fiddler and squareback crabs.

e. Determine whether or not marsh habitat creation is desirable. Not only the ecological, but also the social and economic features of an area should be considered before habitat creation is initiated. Public involvement at a very early planning stage is essential for success.

256. As with habitat creation projects, long term studies are needed to document the long term benefits of primary production and subsequent dispersion to the ecosystem, sediment stabilization, entrapment, nutrient cycling, water quality improvement, benthic community development and habitat for fish and wildlife. Future studies should emphasize plant population structure and zonation related to elevation; inter- and intra-specific competition of plants for the available resources, edaphic changes related to community change in the process of soil genesis, faunal community inventory and changes with emphasis on the major macroinvertebrates, and species diversity and biomass changes in fauna and flora.

257. It is essential to quantify the rates of these changes involved in order to bring about a truly rational habitat development plan. Future management priorities may not rest with the present short term objectives of stabilization, but through public awareness and pressures, managers may be forced to adopt long term plans consistant with local ecological needs, wildlife needs, and recreational use. These long term objectives presently lack adequate research necessary for the fulfillment of such objectives. Further studies of plant zonation, competition, succession, soil genesis, and macrofaunal and wildlife community development will provide essential information on which managers will rely in making future marsh habitat development decisions.

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  Habitat development field investigations, Buttermilk Sound marsh development site, Atlantic Intracoastal Waterway, Georgia; Appendix A: Propagation of marsh plants and post-propagation monitoring / by Robert J. Reimold, Michael A. Hardisky, Patrick C. Adams, Marine Extension Service, University of Georgia, Brunswick, Ga. Vicksburg, Miss. : U. S. Waterways Experiment Station ; Springfield, Va. : available from National Technical Information Service, 1978.
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1. Atlantic Intracoastal Waterway. 2. Buttermilk Sound. 3. Dredged material. 4. Dredged material disposal. 5. Field

(Continued on next card)

Reimold, Robert J
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TA7.W34 no.D-78-26 Appendix A

DREDGED MATERIAL RESEARCH PROGRAM

TECHNICAL REPORT D-78-26

HABITAT DEVELOPMENT FIELD INVESTIGATIONS
BUTTERMILK SOUND MARSH DEVELOPMENT SITE
ATLANTIC INTRACOASTAL WATERWAY, GEORGIA

APPENDIX A: PROPAGATION OF MARSH PLANTS
AND POSTPROPAGATION MONITORING

Draft copy

by

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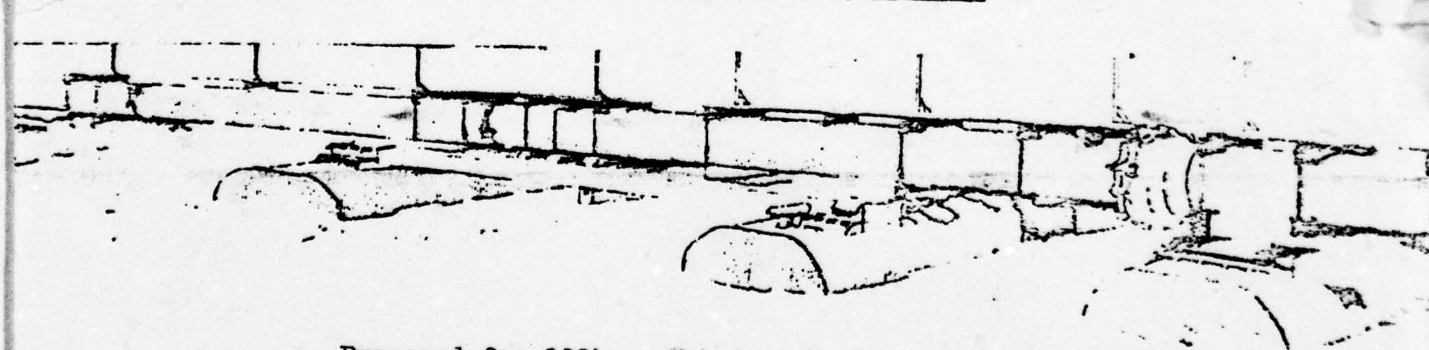
July 1978

Final Report



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Monitored by Environmental Laboratory
U. S. Army Engineer Waterways Experiment Station
P. O. Box 631, Vicksburg, Miss. 39180

TRD-78-76
app A

APPENDIX A

WATER CHEMISTRY

PART 1

Analysis of Variance.

General Linear Model.

Significance denoted by Duncan's Multiple Range Test.

Legend for Variable Codes

REDOX	=	Redox potential (millivolts).
WAT_T	=	Water temperature C^o.
P	=	pH (Hydrogen ion concentration).
TURB	=	Turbidity (ppm).
TPHOS	=	Total phosphorus (ppm).
PPHOS	=	Total particulate phosphorus (ppm).
NITA	=	Nitrate and nitrite nitrogen (ppm).
DOC	=	Dissolved organic carbon (ppm).
TDC	=	Total dissolved carbon (ppm).
TOC	=	Total organic carbon (ppm).
DPHOS	=	Total dissolved phosphorus (ppm).
TNIT	=	Total nitrogen (ppm).
AIR_T	=	Air temperature C^o.
OPHOS	=	Orthophosphate (ppm).
PNIT	=	Total particulate nitrogen (ppm).
DNIT	=	Total dissolved nitrogen (ppm).
AMMO	=	Ammona nitrogen (ppm).
SAL	=	Salinity (0/00).

PART 2

Chemical and Physical Parameters versus Sampling Date.

PART 3

Chemical and Physical Parameters versus time for each Sampling Date.

PART 4

Nitrogen and Phosphorus Components versus time September 1975-February 1976. Nutrient fluctuations in relation to tide stage.

PART 1

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
DAY	17	147 204 253 309 372 421 477 533 589 645 701 756 813 869 925 980 1036

NUMBER OF OBSERVATIONS IN DATA SET = 459

GROUP	OBS	DEPENDENT VARIABLES
1	387	REDOX
2	455	WAT_T
3	453	P
4	395	TURB
5	443	TPHOS OPHOS
6	416	PPHOS PNIT ONIT
7	445	NITA AMMO
8	127	DOC
9	25	TOC
10	2	TOC
11	418	DPHOS
12	445	TNIT

NOTE: VARIABLES IN EACH GROUP ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES.

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: REDOX

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	14	1816812.95397810	129772.35385558	48.52	0.0001	0.646133	25.9197
ERROR	372	995013.39227513	2674.76718354		STD DEV		REDOX MEAN
CORRECTED TOTAL	386	2811826.34625323			51.71815139		199.53229974

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
DAY	14	1816812.95397810	48.52	0.0001	14	1816812.95397810	48.52	0.0001

A4

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   13:02 WEDNESDAY, DECEMBER 21, 1977   3

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE REDOX

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=372   MS=2674.77

GROUPING			MEAN	N	DAY
	A		345.740741	27	589
	B		254.107143	28	645
C	B		232.500000	22	756
C	B		231.960000	25	477
C	B		231.076923	26	913
C	D		222.592593	27	701
C	D	E	209.740741	27	533
C	D	E	205.153846	26	925
	D	E	198.222222	27	372
	D	E	193.692308	25	980
		E	187.850000	20	421
	F	E	177.846154	26	1035
G	F		153.296296	27	369
G			127.407407	27	339
	H		18.923077	26	253

A5

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: WAT_T

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	16	26288.51090497	1643.03193156	1424.40	0.0001	0.981144	4.9666
ERROR	438	505.22830383	1.15348928		STD DEV		WAT_T MEAN
CORRECTED TOTAL	454	26793.73920879			1.07400618		21.62439550

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
DAY	16	26288.51090497	1424.40	0.0001	16	26288.51090497	1424.40	0.0001

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE WAT_T

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=433   MS=1.15349

GROUPING	MEAN	N	DAY
A	31.096154	26	925
B	28.866667	27	589
B	28.800000	26	253
C	27.759259	27	980
C	27.722222	27	204
D	26.500000	27	147
D	26.055556	27	533
E	24.846429	28	645
E	24.703704	27	869
F	23.981481	27	477
G	21.148148	27	309
H	19.000000	26	1035
I	17.111111	27	813
J	16.065385	26	421
K	9.925926	27	701
K	9.833333	27	372
L	3.730769	26	756

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: P

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	16	94.28553136	5.39284571	28.96	0.0001	0.515169	6.2067
ERROR	436	88.73305584	0.20351618		STD DEV		P MEAN
CORRECTED TOTAL	452	183.01858720			0.45112768		7.26843267

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
DAY	16	94.28553136	28.96	0.0001	16	94.28553136	28.96	0.0001

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   13:02 WEDNESDAY, DECEMBER 21, 1977   7

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE P

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=436   MS=0.203516

GROUPING			MEAN	N	DAY
	A		7.966667	27	204
B	A		7.896154	26	756
B	C		7.677778	27	813
D	C		7.614815	27	701
D	C		7.552963	27	372
D	C	E	7.481481	27	309
D	C	E	7.477778	27	477
D	F	E	7.398462	26	421
G	F	E	7.288889	27	569
G	F	E	7.264000	25	980
G	F	H	7.200000	28	645
G		H	7.092593	27	533
G		H	7.053846	26	925
G		H	7.022222	27	869
		H	6.976923	26	1035
	I		6.419231	26	253
	J		6.159259	27	147

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: TURB

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	14	10295.57632350	735.39830882	36.06	0.0001	0.570522	45.9609
ERROR	380	7750.32509422	20.39559235		STD DEV		TURB MEAN
CORRECTED TOTAL	394	18045.90141772			4.51614796		9.82607595

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
DAY	14	10295.57632350	36.06	0.0001	14	10295.57632350	36.06	0.0001

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   13:02 WEDNESDAY, DECEMBER 21, 1977   9

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE TUF3

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=383   MS=20.3956

GROUPING		MEAN	N	DAY
	A	18.432143	28	645
B	A	17.751852	27	477
B	C	15.330000	20	925
	C	14.633333	27	869
D	C	13.692593	27	813
D	E	11.719231	26	701
D	E	11.534615	26	589
F	E	9.429630	27	980
F		7.900000	26	421
F		7.744444	27	533
	G	4.488889	27	204
	G	4.269231	26	253
	G	3.944444	27	147
	G	3.877778	27	309
	G	3.607407	27	372

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: TPHOS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	16	87.69289275	5.48080580	92.90	0.0001	0.777240	58.8216
ERROR	426	25.13309235	0.05899787		STD DEV		TPHOS MEAN
CORRECTED TOTAL	442	112.82598510			0.24289477		0.41293434

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
DAY	16	87.69289275	92.90	0.0001	16	87.69289275	92.90	0.0001

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   13:02 WEDNESDAY, DECEMBER 21, 1977   11

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: OPHOS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	16	23.25487364	1.45342960	137.17	0.0001	0.837450	58.8849
ERROR	426	4.51378505	0.01059574		STD DEV		OPHOS MEAN
CORRECTED TOTAL	442	27.76865869			0.10293551		0.17483813

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
DAY	16	23.25487364	137.17	0.0001	16	23.25487364	137.17	0.0001

A13

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE TPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=426 MS=.0589979

GROUPING				MEAN	N	DAY
		A		1.632000	25	756
		B		1.256296	27	813
		C		0.852222	27	980
		C		0.850000	26	589
		D		0.351200	25	1035
E		D		0.333333	27	869
E		D		0.331923	26	421
E		D	F	0.295000	26	701
E	G	D	F	0.235000	20	925
E	G		F	0.191481	27	645
	G	H	F	0.160000	26	533
	G	H		0.143704	27	372
	G	H		0.142222	27	477
	G	H		0.085556	27	204
	G	H		0.082692	26	253
	G	H		0.079630	27	309
		H		0.024444	27	147

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   13:02 WEDNESDAY, DECEMBER 21, 1977   13

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE PPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=426   MS=.0105957

GROUPING				MEAN	N	DAY
		A		0.964800	25	1036
		B		0.461111	27	813
		C		0.397778	27	980
		D		0.195185	27	869
		D		0.170385	26	589
E		D		0.140800	25	756
E		F		0.104074	27	147
E		F	G	0.103462	26	701
E	H	F	G	0.084500	20	925
	H	F	G	0.076296	27	477
	H	F	G	0.061154	26	421
	H	F	G	0.061154	26	533
	H	F	G	0.048148	27	372
	H		G	0.039259	27	645
	H			0.032222	27	309
	H			0.030000	26	253
	H			0.017407	27	204

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: PPHOS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	15	16.68509089	1.11233939	33.84	0.0001	0.559302	79.5633
ERROR	400	13.14690502	0.03286726		STD DEV		PPHOS MEAN
CORRECTED TOTAL	415	29.83199591			0.18129331		0.22785058

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
DAY	15	16.68509089	33.84	0.0001	15	16.68509089	33.84	0.0001

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: PNIT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	15	49.15717025	3.27714468	1.65	0.0577	0.058370	278.6047
ERROR	400	793.01436822	1.98253592		STD DEV		PNIT MEAN
CORRECTED TOTAL	415	842.17153846			1.40802554		0.50538462

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
DAY	15	49.15717025	1.65	0.0577	15	49.15717025	1.65	0.0577

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: DNIT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	15	115.59891145	7.70659410	8.51	0.0001	0.241981	90.3352
ERROR	400	362.12004239	0.90530011		STD DEV		DNIT MEAN
CORRECTED TOTAL	415	477.71895385			0.95147260		1.05326923

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
DAY	15	115.59891145	8.51	0.0001	15	115.59891145	8.51	0.0001

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GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE PPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=400   MS=.0328673

GROUPING				MEAN	N	DAY
	A			0.713200	25	756
	B			0.550000	26	589
	B			0.527778	27	813
	C			0.400741	27	980
	D			0.275200	25	1035
E	D			0.200000	27	869
E	C		F	0.177692	26	701
E	G		F	0.139231	26	421
E	G		F	0.134500	20	925
E	G		F	0.118519	27	372
E	G		F	0.090769	26	253
	G		F	0.081111	27	645
	G		F	0.070000	27	477
	G		F	0.064815	27	204
	G			0.058077	26	533
	G			0.054815	27	147

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE PNIT

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=400   MS=1.98254

GROUPING	MEAN	N	DAY
A	1.561538	26	421
B	0.734615	26	701
B	0.715385	26	533
B	0.661538	26	589
B	0.629259	27	147
B	0.611111	27	645
B	0.533333	27	869
B	0.480769	26	253
B	0.454815	27	204
B	0.425926	27	477
B	0.345200	25	1036
B	0.335185	27	372
B	0.273000	20	925
B	0.125926	27	813
B	0.124000	25	756
B	0.034444	27	980

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   13:02 WEDNESDAY, DECEMBER 21, 1977

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE UNIT

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=400   MS=0.9053

GROUPING			MEAN	N	DAY
	A		2.225926	27	869
B	A		1.832593	27	372
B	C		1.603704	27	477
B	C	D	1.484615	26	701
E	C	D	1.123077	26	421
E	C	D	1.076000	25	1036
E	C	D	1.065185	27	147
E		D	0.996296	27	813
E		D	0.957692	26	253
E	F	D	0.900000	27	645
E	F	D	0.880769	26	533
E	F	G	0.825185	27	204
E	F	G	0.811538	26	589
H	F	G	0.296000	20	925
H		G	0.293333	27	980
H			0.224000	25	755

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: NITA

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	16	11.87052650	0.74190791	155.43	0.0001	0.853168	32.8607
ERROR	428	2.04294631	0.00477324		STD DEV		NITA MEAN
CORRECTED TOTAL	444	13.91347281			0.06908863		0.21024719

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
DAY	16	11.87052650	155.43	0.0001	16	11.87052650	155.43	0.0001

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: AMMO

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	16	20.96247024	1.31015439	54.85	0.0001	0.672163	81.3848
ERROR	428	10.22412617	0.02388815		STD DEV		AMMO MEAN
CORRECTED TOTAL	444	31.18659640			0.15455790		0.18991011

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
DAY	16	20.96247024	54.85	0.0001	16	20.96247024	54.85	0.0001

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE NITA

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=428   MS=.0047732

GROUPING	MEAN	N	DAY
A	0.614074	27	980
A	0.579259	27	477
B	0.335185	27	869
C	0.222222	27	645
C	0.216154	26	589
C	0.206400	25	533
C	0.204231	26	372
C	0.204074	27	421
C	0.190385	26	755
C	0.183462	26	1035
D	0.140741	27	147
E D	0.118077	26	253
E D	0.104444	27	309
E	0.095556	27	204
E	0.082593	27	701
F	0.011000	20	925
F	0.009259	27	813

STATISTICAL ANALYSIS SYSTEM 13:02 WEDNESDAY, DECEMBER 21, 1977

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE AMMP

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=428 MS=.0238881

GROUPING			MEAN	N	DAY
	A		0.885185	27	980
	B		0.576538	26	1035
	C		0.320000	20	925
	D C		0.200800	25	533
	D C		0.196667	27	869
E	D		0.162222	27	477
E	D		0.155556	27	701
E	D	F	0.124615	26	756
E	D	F	0.116667	27	421
E		F	0.096923	26	253
E		F	0.077778	27	813
E		F	0.075556	27	309
E		F	0.074444	27	147
		F	0.057778	27	204
		F	0.056923	26	372
		F	0.043704	27	645
		F	0.039615	26	589

STATISTICAL ANALYSIS SYSTEM   13:02 WEDNESDAY, DECEMBER 21, 1977

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: DOC

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	4	225.40895731	56.35223933	35.66	0.0001	0.539012	13.4562
ERROR	122	192.77986159	1.58016280		STD DEV		DOC MEAN
CORRECTED TOTAL	126	418.18881890			1.25704527		9.34173228

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
DAY	4	225.40895731	35.65	0.0001	4	225.40895731	35.66	0.0001

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE DOC

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=122   MS=1.58016

GROUPING		MEAN	N	DAY
	A	10.470370	27	589
B	A	10.326923	26	701
B	C	9.703704	27	813
	C	9.240909	22	645
	D	6.796000	25	756

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: TDC

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	0	0.00000000	0.00000000	0.00	1.0000	0.000000	9.9217
ERROR	24	24.73440000	1.03060000		STD DEV		TDC MEAN
CORRECTED TOTAL	24	24.73440000			1.01518471		10.23200000

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
DAY	0	0.00000000	.	.	0	0.00000000	.	.

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE TDC

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=24   MS=1.0306

GROUPING	MEAN	N	DAY
A	10.232000	25	755

STATISTICAL ANALYSIS SYSTEM 13:02 WEDNESDAY, DECEMBER 21, 1977 28

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: TOC

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	1	29.64500000	29.64500000	99999.99	0.0000	1.000000	0.0000
ERROR	0	0.00000000	0.00000000		STD DEV		TOC MEAN
CORRECTED TOTAL	1	29.64500000			0.00000000		3.85000000

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
DAY	1	29.64500000	.	.	1	29.64500000	.	.

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE TOC

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=0   MS=0

GROUPING	MEAN	N	DAY
A	7.800000	1	756
B	0.100000	1	253

Contract monitor:

page A32

Sheet 30, 13:02 WER, Dec 21, 77
for dependent variable DPHOS

This was missing from originals
furnished O8GAD. Do you have it?

(Herb - Jean Hunt said to let this go.
Just leave it blank; don't bother to
renumber Appendix A pages)

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   13:02 WEDNESDAY, DECEMBER 21, 1977 31

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE OPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=402   MS=.0573281

GROUPING			MEAN	N	DAY
	A		1.033333	27	756
	B		0.740741	27	813
	C		0.443704	27	980
	D		0.271923	26	1035
E	D		0.264000	25	589
E	D	F	0.167407	27	421
E	D	F	0.144615	26	701
E	D	F	0.140741	27	869
E	D	F	0.134500	20	925
E		F	0.118519	27	372
		F	0.110000	27	645
		F	0.103600	25	533
		F	0.103333	27	147
		F	0.092692	26	253
		F	0.088148	27	477
		F	0.085926	27	204

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: TNIT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	16	195.70197186	12.23137324	5.19	0.0001	0.162514	110.7558
ERROR	428	1008.51594724	2.35634567		STD DEV		TNIT MEAN
CORRECTED TOTAL	444	1204.21791910			1.53503931		1.38595506

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
DAY	16	195.70197186	5.19	0.0001	16	195.70197186	5.19	0.0001

STATISTICAL ANALYSIS SYSTEM 13:02 WEDNESDAY, DECEMBER 21, 1977 33

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE TNIT

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

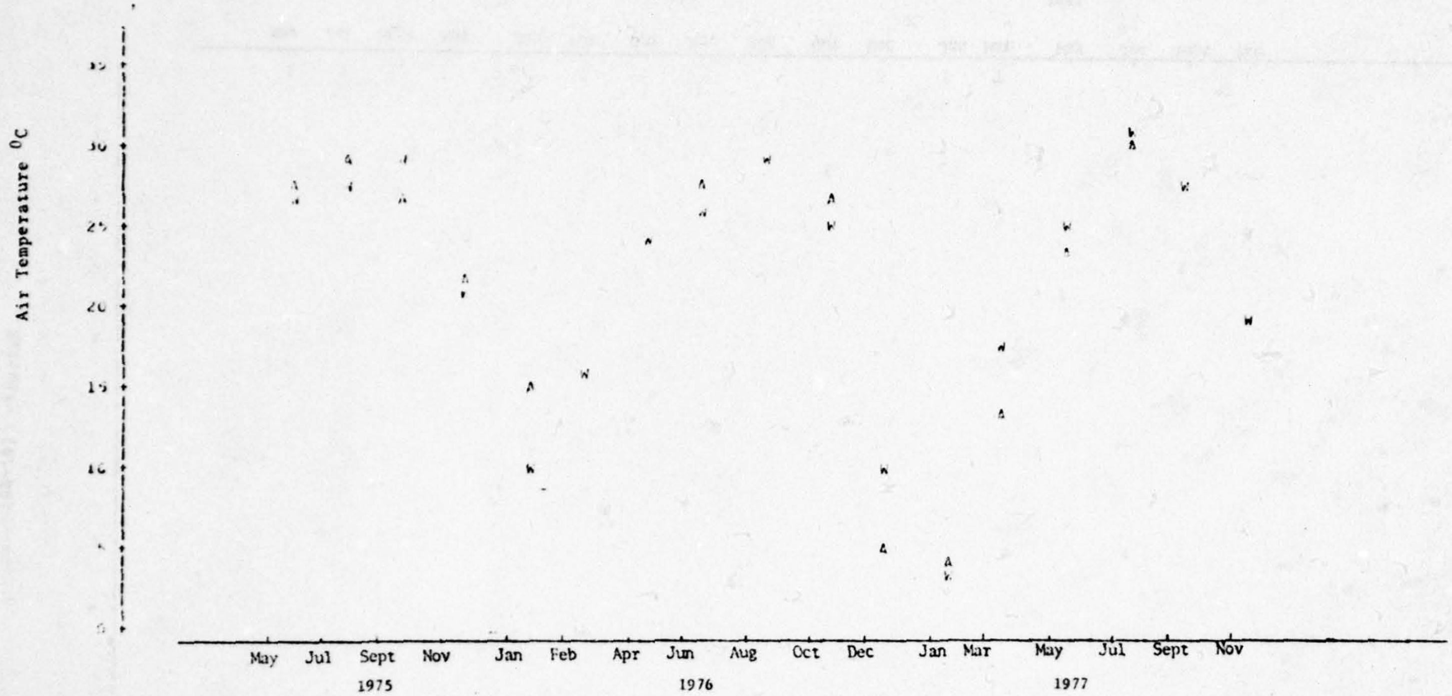
ALPHA LEVEL=.05 DF=428 MS=2.35635

GROUPING					MEAN	N	DAY
			A		2.621077	26	421
	B		A		2.290000	27	372
	B		A	C	2.219231	26	701
	B	D	A	C	2.044444	27	477
E	B	D	A	C	1.907407	27	869
E	B	D	F	C	1.554000	25	533
E	B	D	F	C	1.507407	27	645
E	B	D	F	C	1.453846	26	589
E	B	D	F	C	1.442308	26	253
E	G	D	F	C	1.307407	27	204
E	G	D	F	H	1.080000	26	1035
E	G		F	H	1.064074	27	147
E	G		F	H	0.996296	27	813
	G		F	H	0.719259	27	239
	G		F	H	0.546000	20	925
	G			H	0.362963	27	756
				H	0.293333	27	980

PART 2

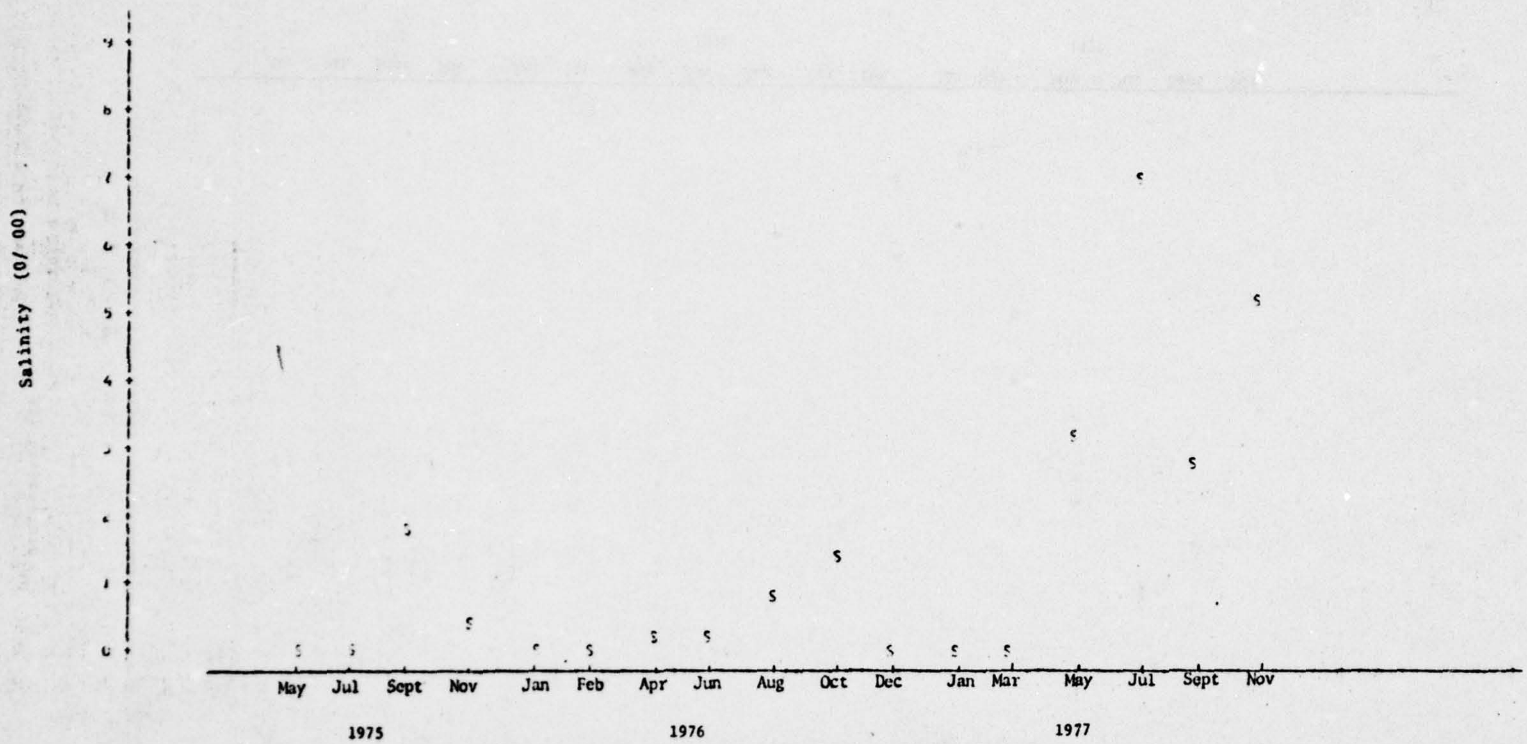
PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN BYSAMPLING DATE 1
19:31 TUESDAY, DECEMBER 20, 1977

PLOT OF DAY*AIR_TEMP LEGEND: SYMBOL USED IS CHARACTER A
PLOT OF DAY*WAT_TEMP LEGEND: SYMBOL USED IS CHARACTER W



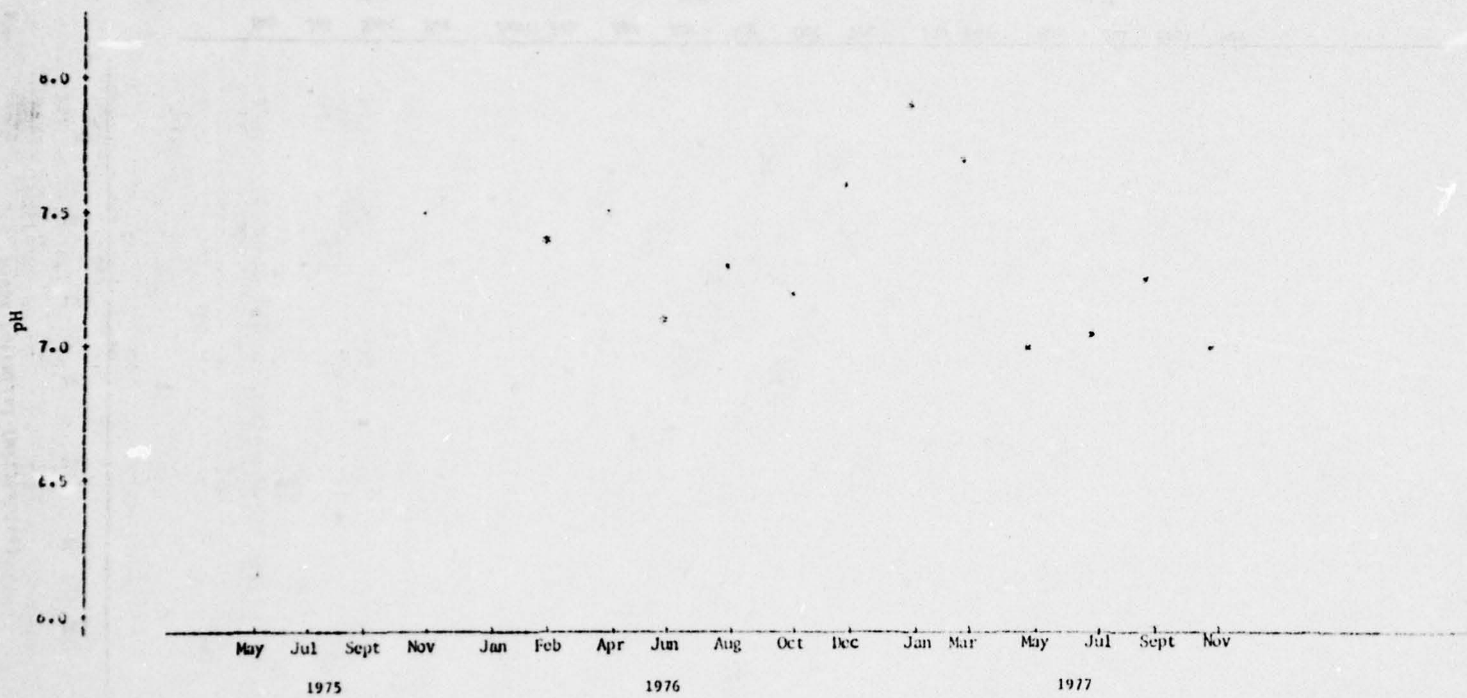
PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN BYSAMPLING DATE 19:31 TUESDAY, DECEMBER 20, 1977 2

PLOT OF LAYR*SALINITY   LEGEND: SYMBOL USED IS S

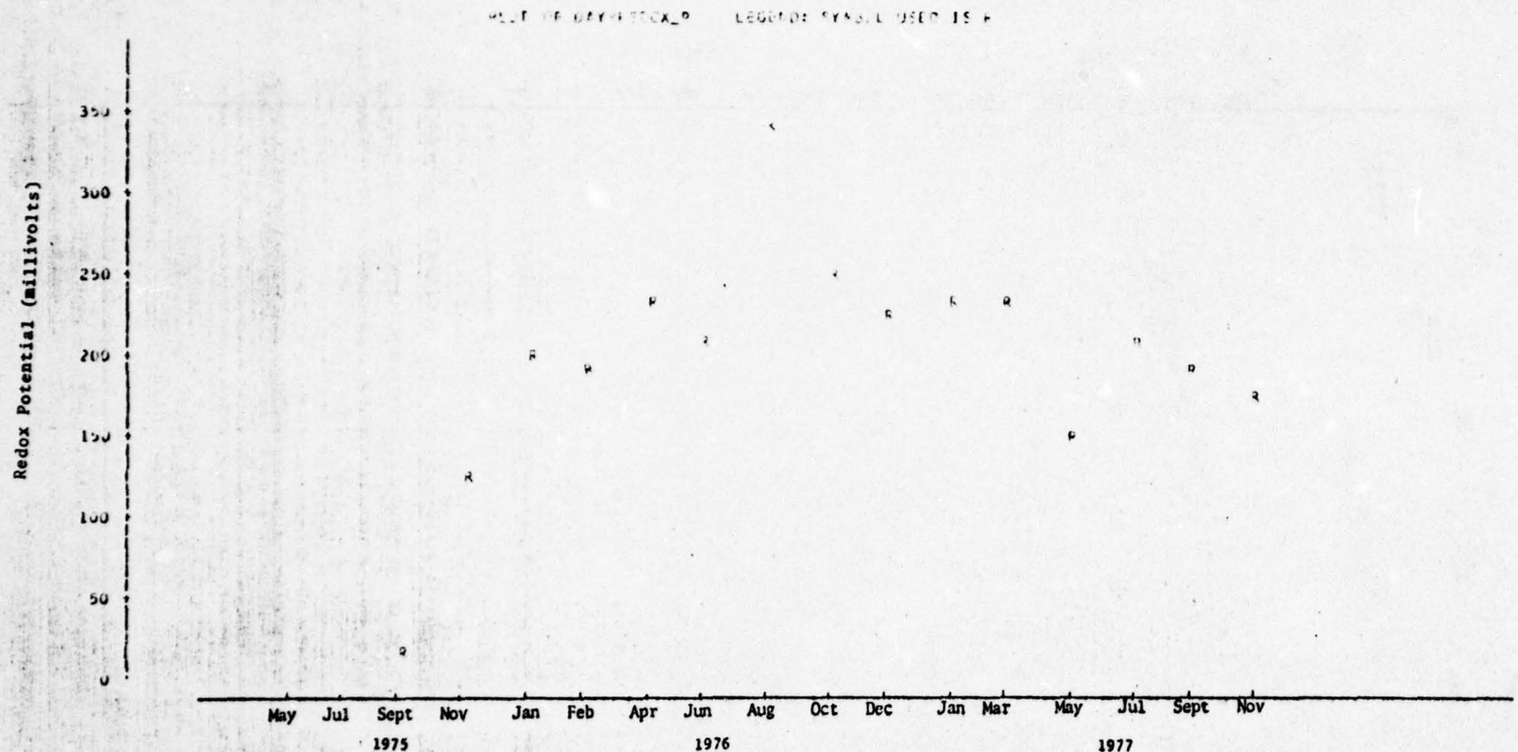


PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN BYSAMPLING DATE 3
19:31 TUESDAY, DECEMBER 20, 1977

PLOT OF DAY*PH   LEGEND: SYMBOL USED IS *

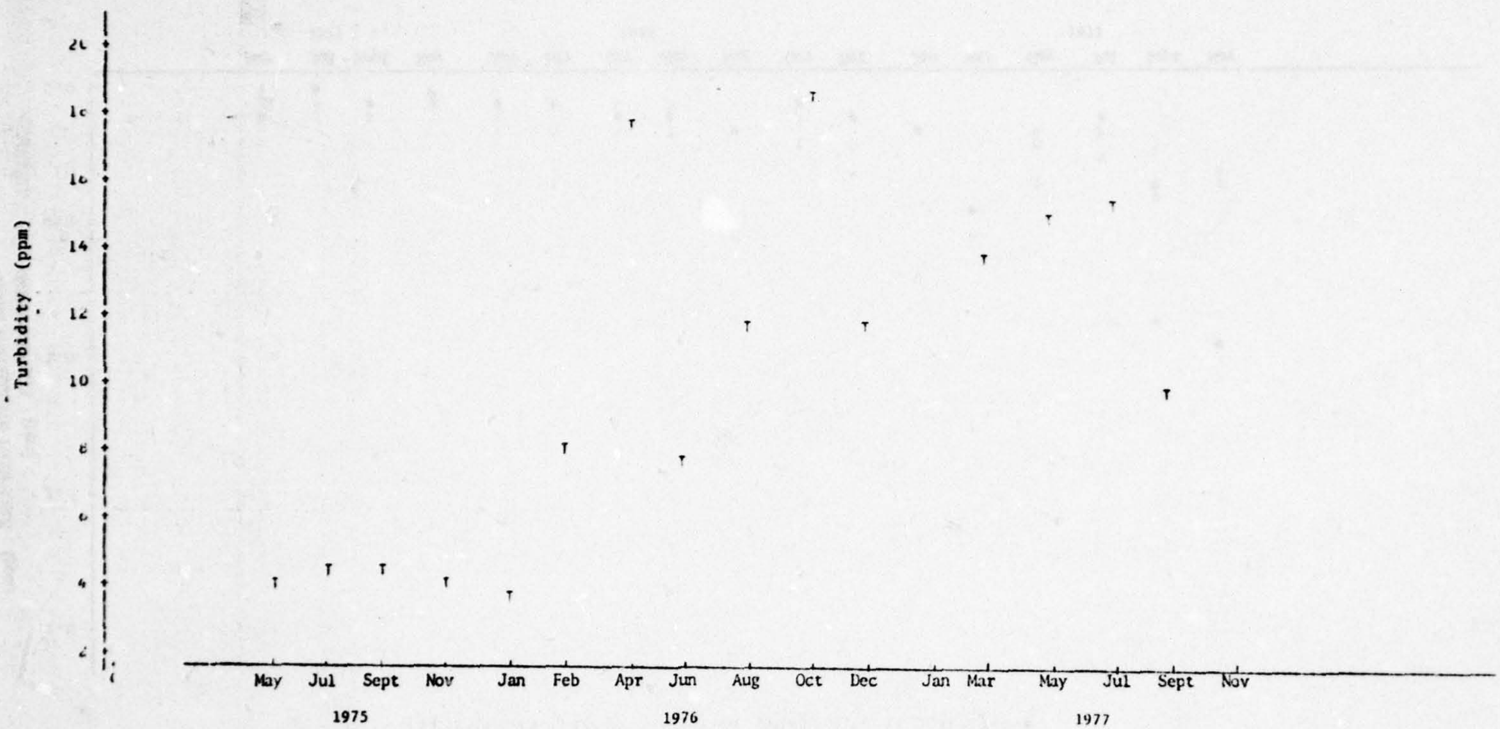


PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN BYSAMPLING DATE
19:31 TUESDAY, DECEMBER 20, 1977 4



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN BYSAMPLING DATE
19:31 TUESDAY, DECEMBER 20, 1977 5

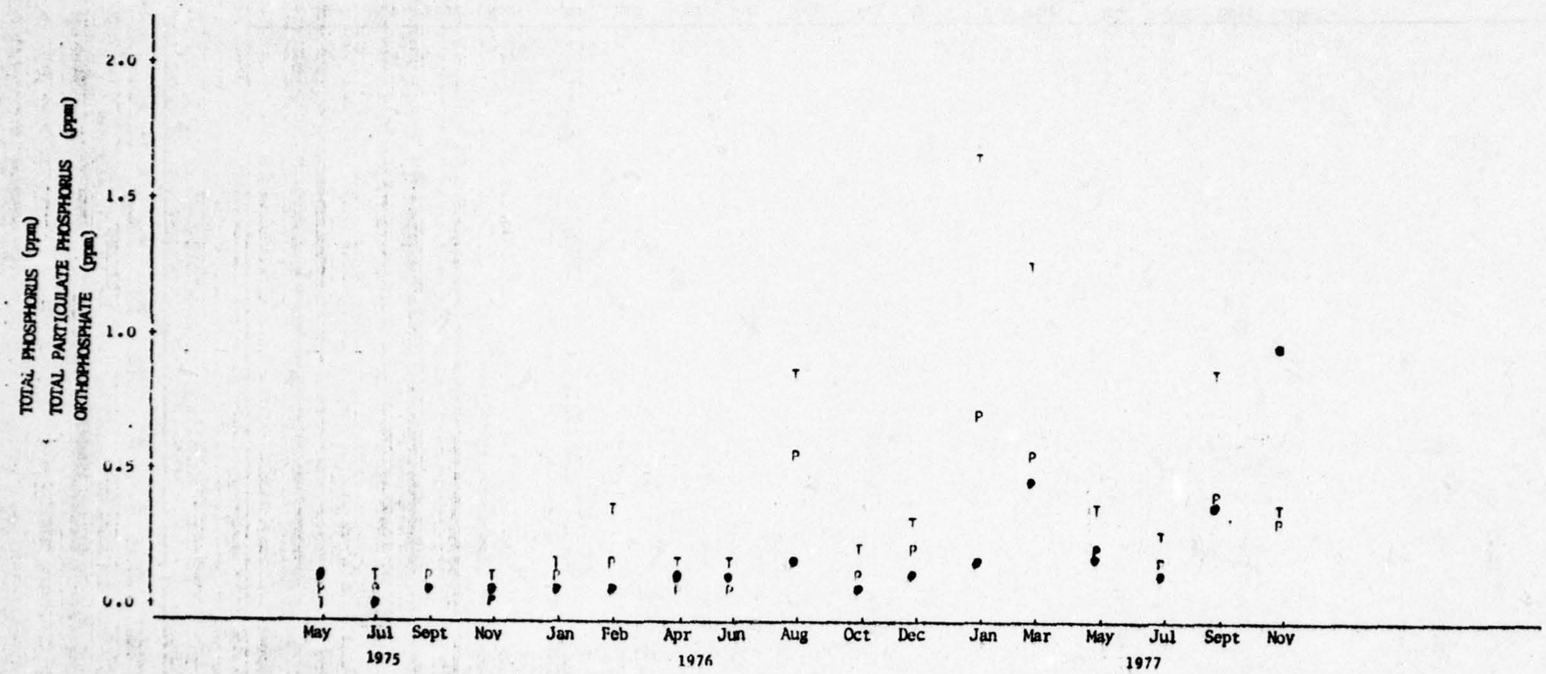
PLOT OF DAY*TURBID LEGEND: SYMBOL USED IS T



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN BYSAMPLING DATE 6

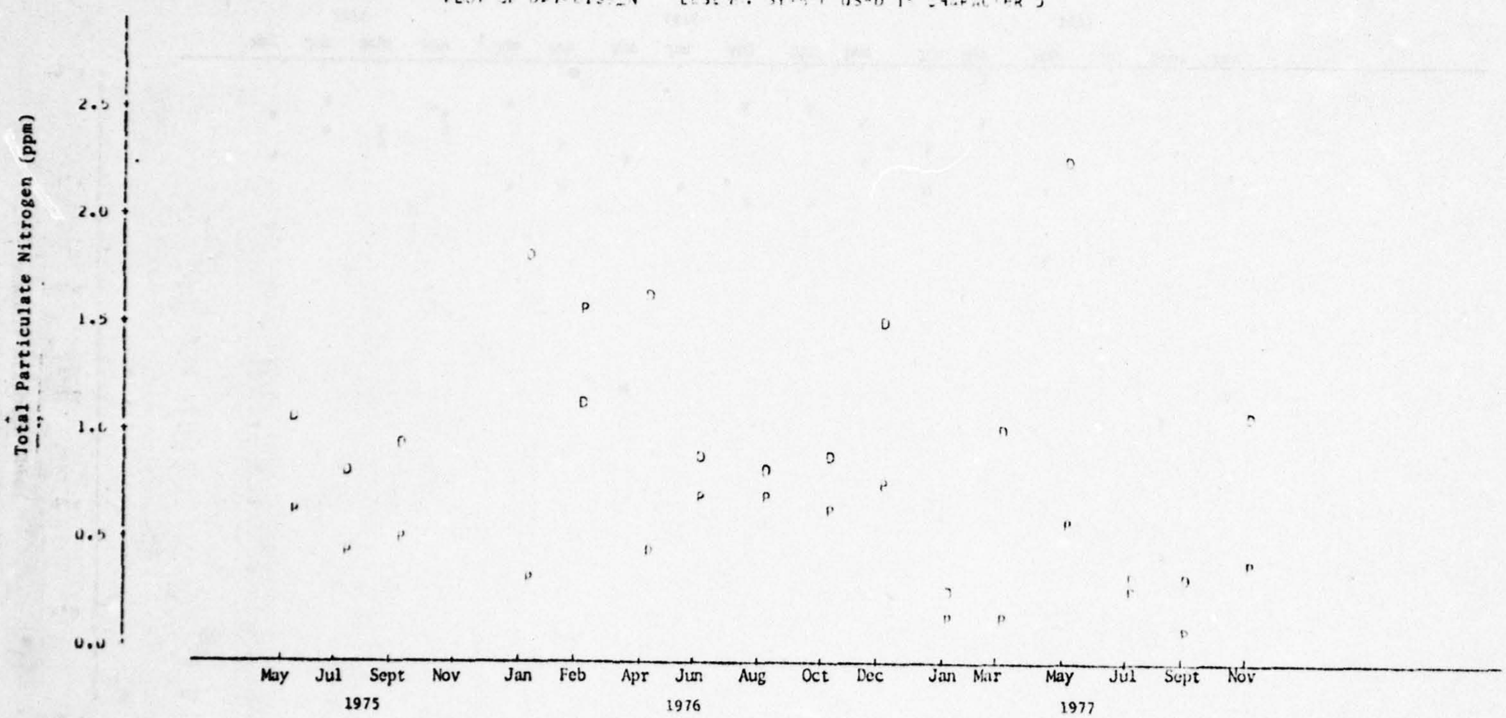
19:31 TUESDAY, DECEMBER 20, 1977

PLOT OF DAY*TOT_P LEGEND: SYMBOL USED IS CHARACTER T
PLOT OF DAY*PART_P LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF DAY*ORTHO_P LEGEND: SYMBOL USED IS CHARACTER ●



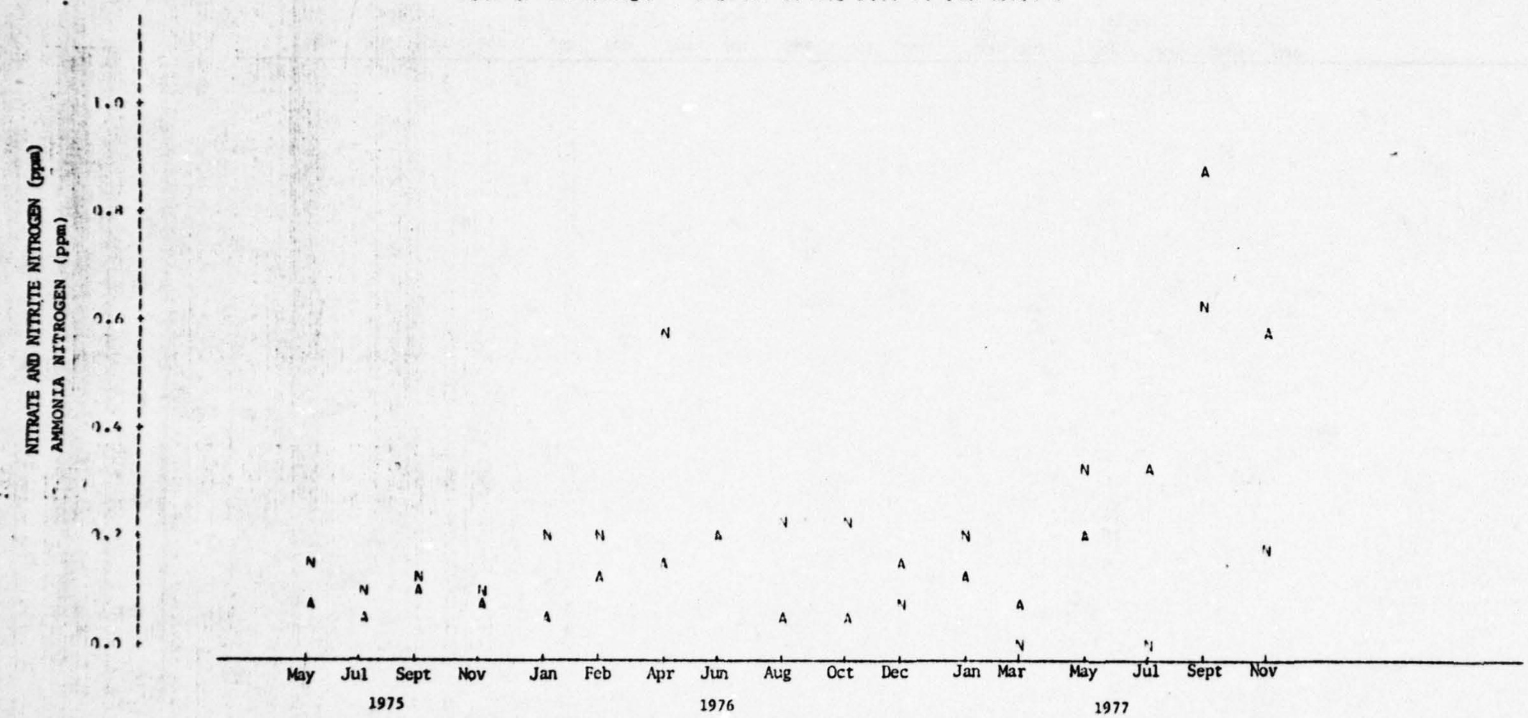
PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN BYSAMPLING DATE 7
19:31 TUESDAY, DECEMBER 20, 1977

PLOT OF DAY*PART_N LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF DAY*DISS_N LEGEND: SYMBOL USED IS CHARACTER D



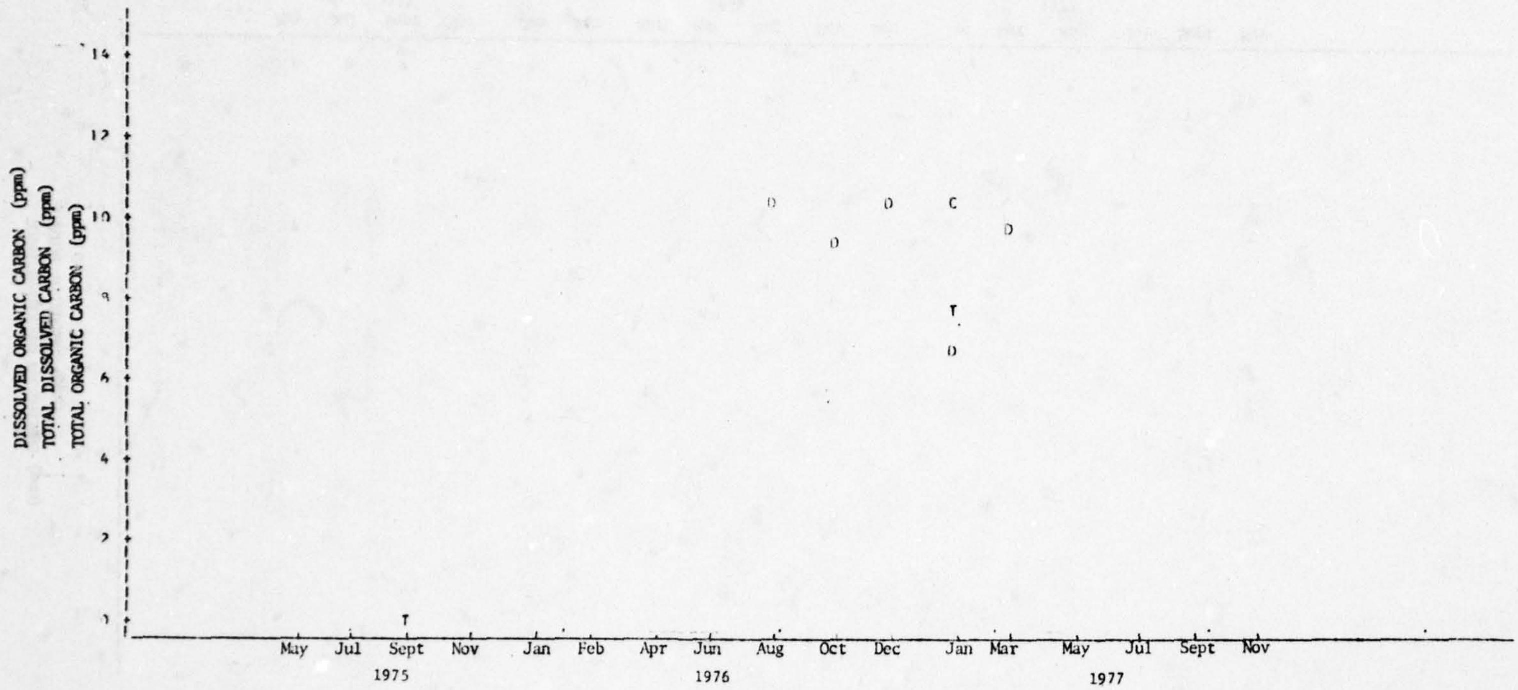
BUTTERMILK SOUND PHYSICAL AND CHEMICAL ANALYSIS OF WATER COLUMN FOR EACH SAMPLING DATE 1
21:39 TUESDAY, DECEMBER 20, 1977

PLOT OF DAY*NITRA_N LEGEND: SYMBOL USED IS CHARACTER N
PLOT OF DAY*AMMO_N LEGEND: SYMBOL USED IS CHARACTER A



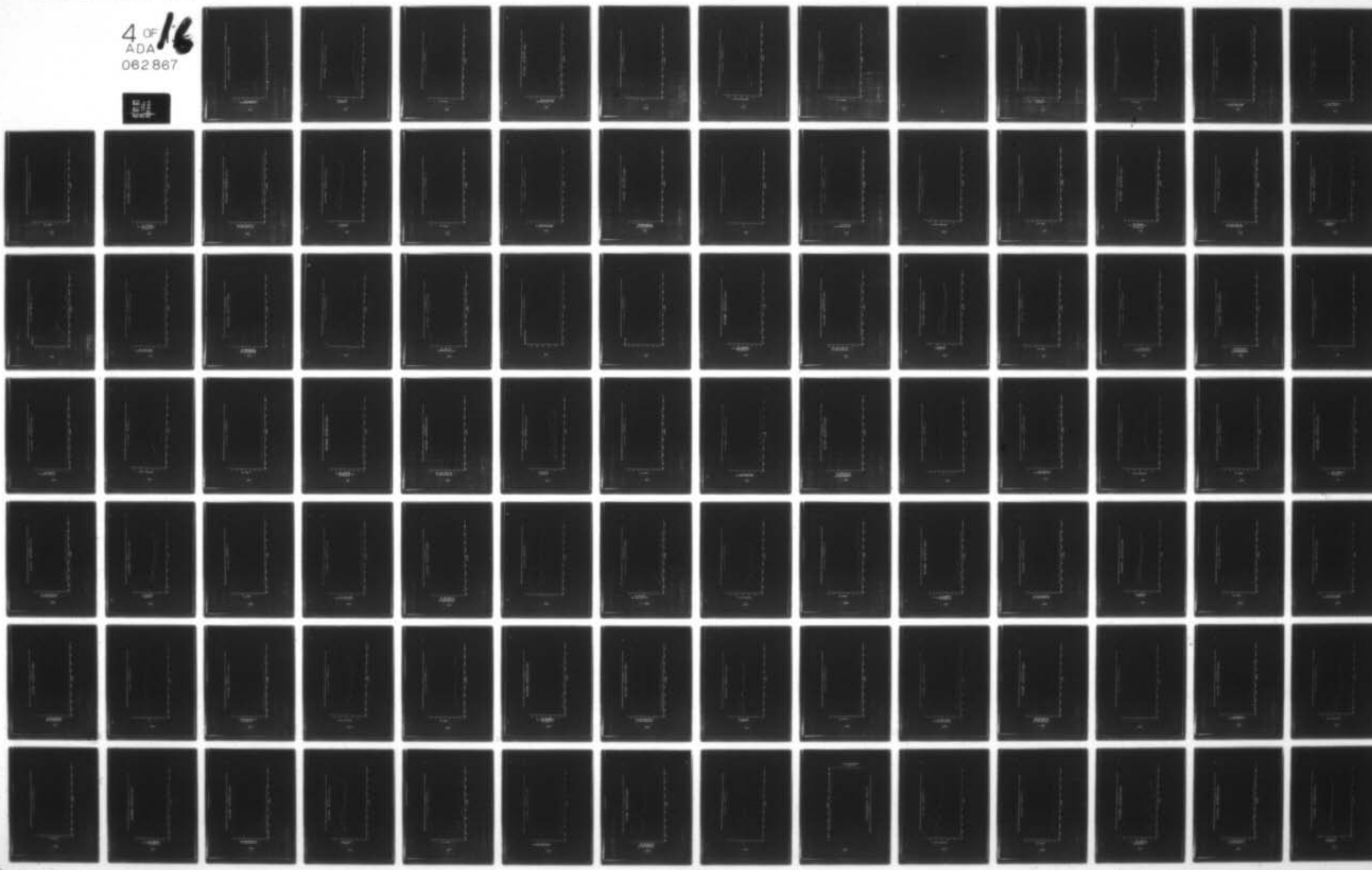
BUTTERMILK SOUND PHYSICAL AND CHEMICAL ANALYSIS OF WATER COLUMN FOR EACH SAMPLING DATE
21:39 TUESDAY, DECEMBER 20, 1977 2

PLOT OF DAY*DISS_OC LEGEND: SYMBOL USED IS CHARACTER D
PLOT OF DAY*TOTDIS_C LEGEND: SYMBOL USED IS CHARACTER C
PLOT OF DAY*TOT_OC LEGEND: SYMBOL USED IS CHARACTER T



AD-A062 867 GEORGIA UNIV BRUNSWICK MARINE EXTENSION SERVICE F/G 13/2
HABITAT DEVELOPMENT FIELD INVESTIGATIONS BUTTERMILK SOUND MARSH--ETC(U)
JUL 78 R J REIMOLD, M A HARDISKY, P C ADAMS DACW21-75-C-0074
UNCLASSIFIED WES-TR-D-78-26-APP-A NL

4 OF 16
ADA
062867



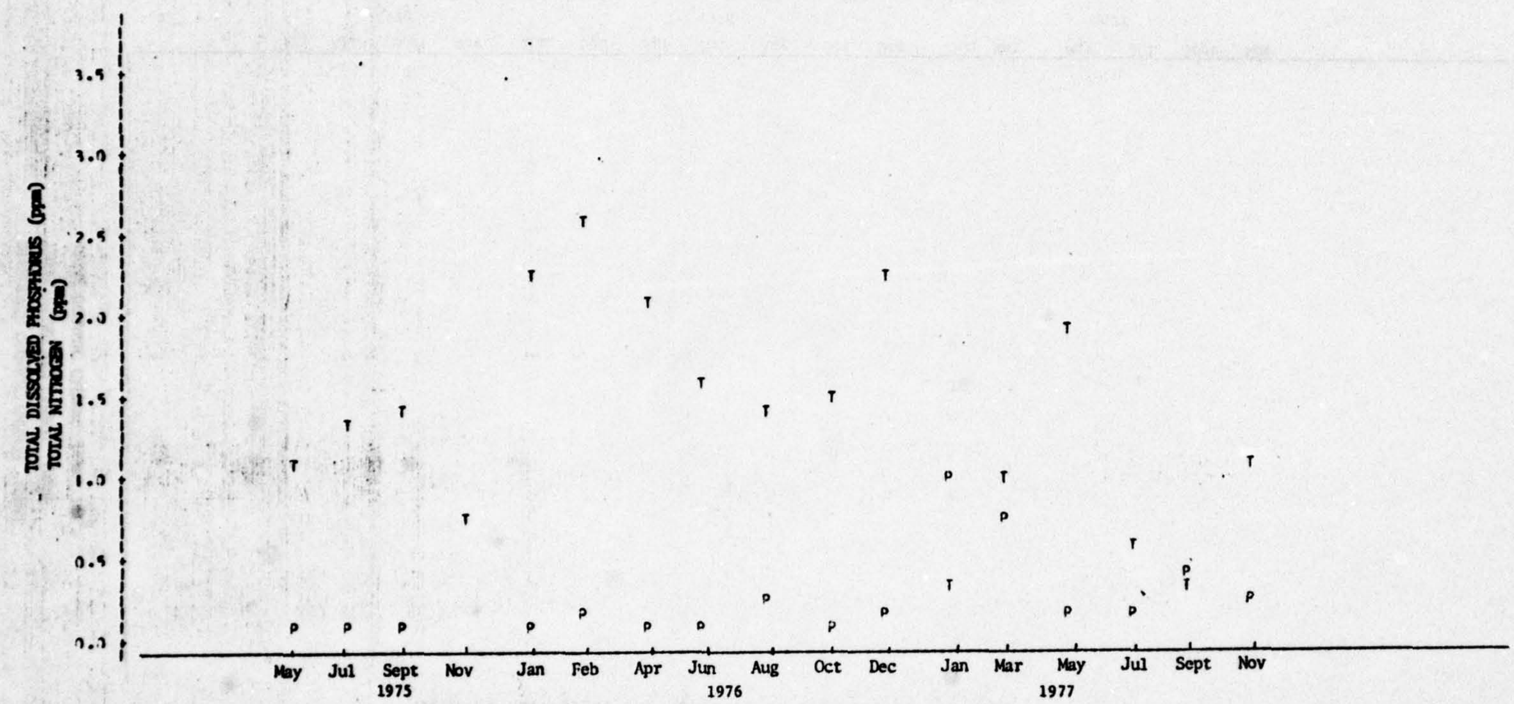
4 OF 1[illegible]

ADA

062867

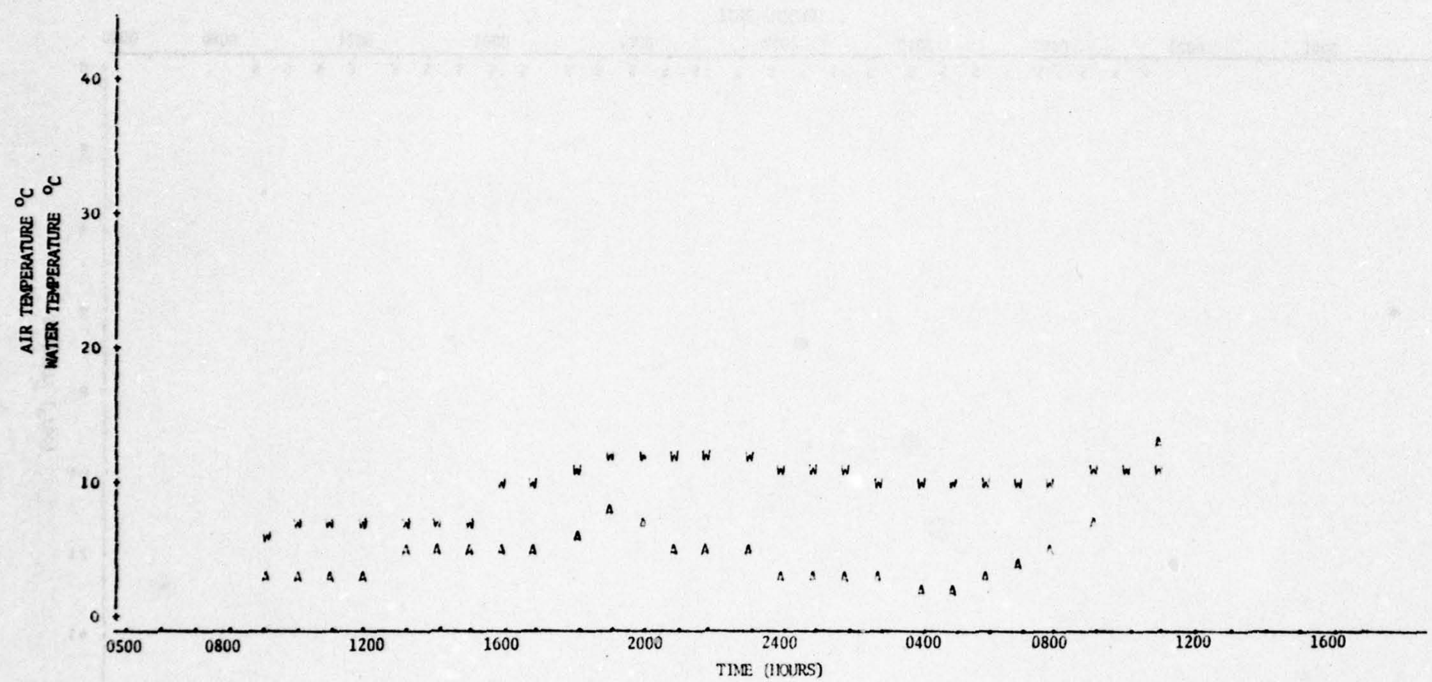
BUTTERMILK SOUND PHYSICAL AND CHEMICAL ANALYSIS OF WATER COLUMN FOR EACH SAMPLING DATE
21:39 TUESDAY, DECEMBER 20, 1977

PLOT OF DAY*DISS_P LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF DAY*TOT_N LEGEND: SYMBOL USED IS CHARACTER T



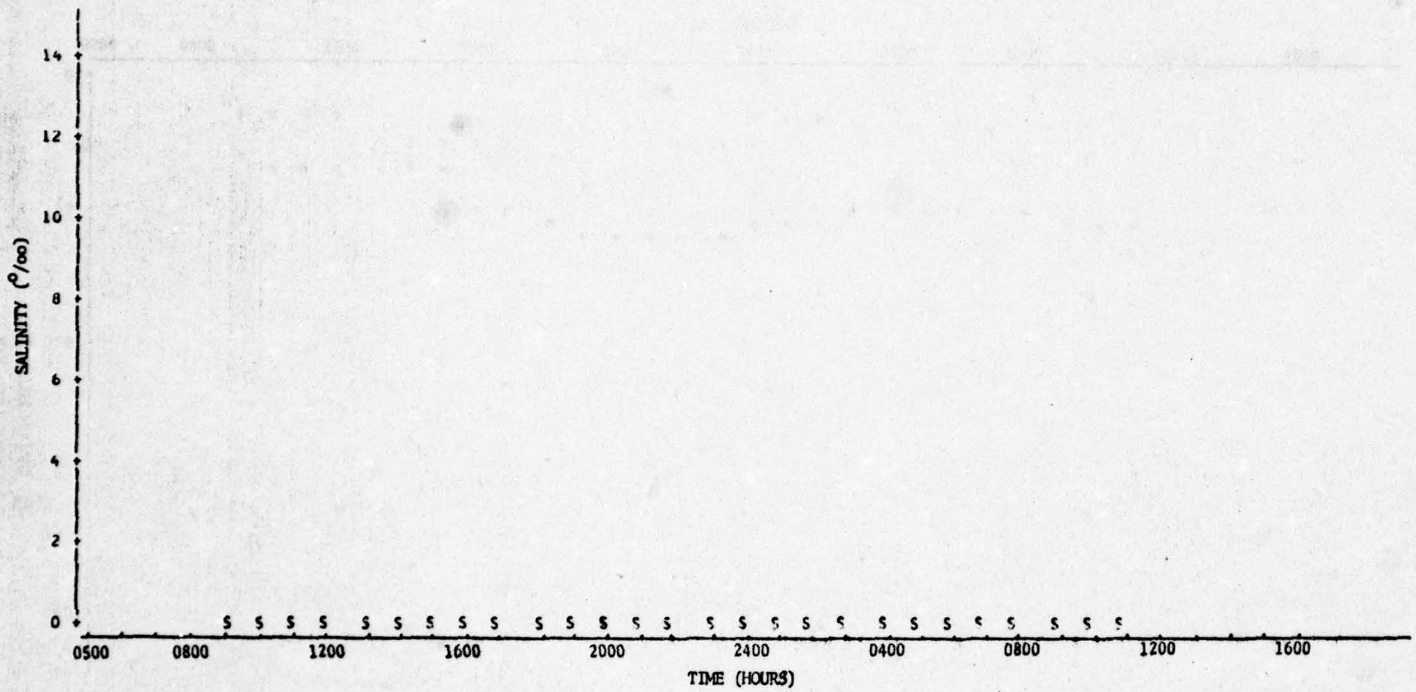
1 - 2 December 1976

PLOT OF TIME*AIR_T   LEGEND: SYMBOL USED IS CHARACTER A
PLOT OF TIME*WAT_T   LEGEND: SYMBOL USED IS CHARACTER W



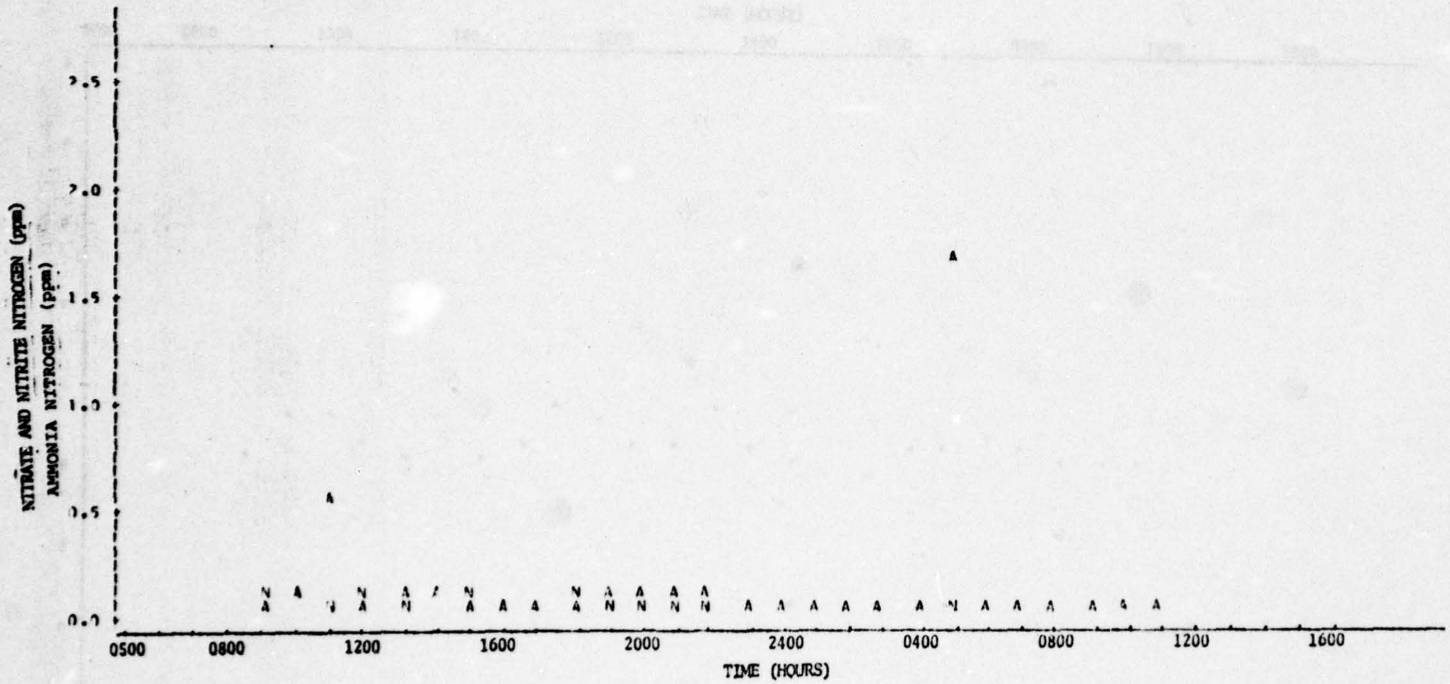
1 - 2 December 1976

PLOT OF TIME*SAL   LEGEND: SYMBOL USED IS S



1 - 2 December 1976

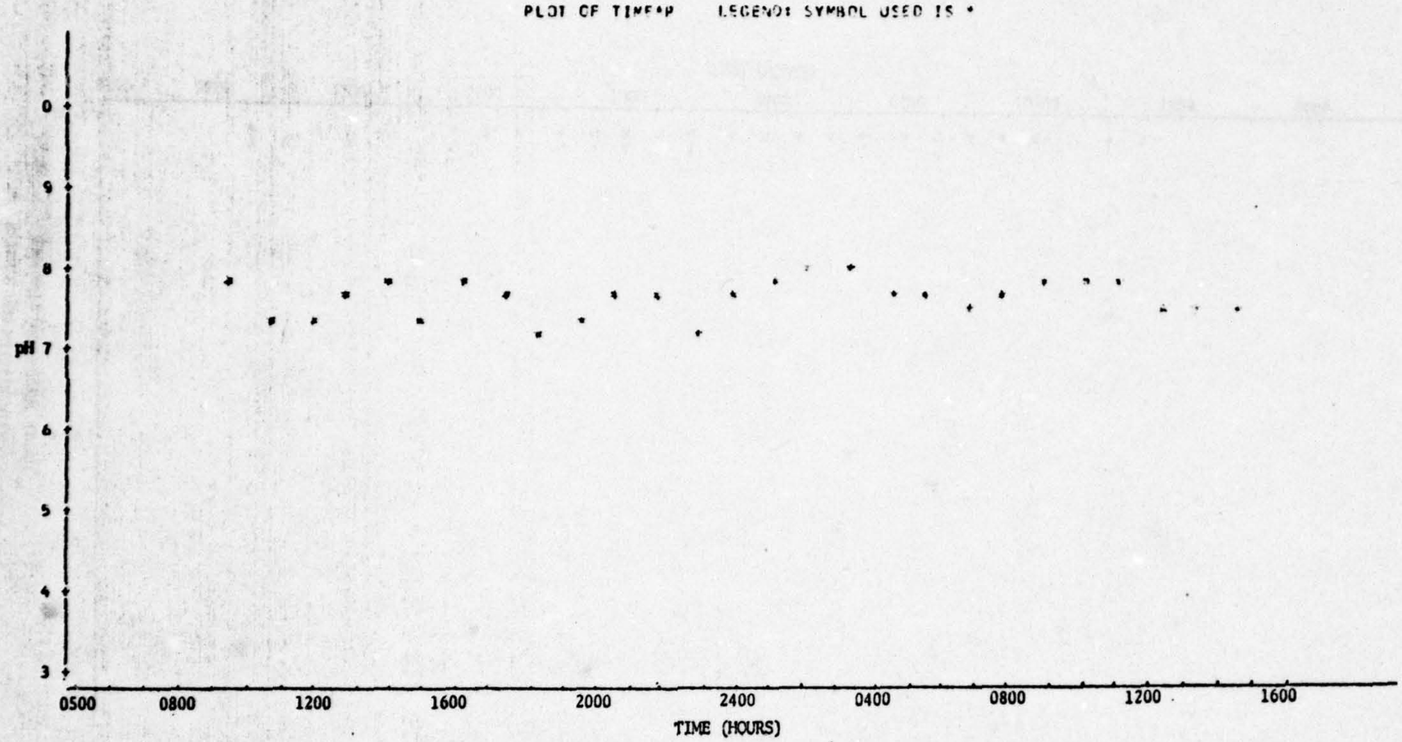
PLOT OF TIME*NITA   LEGEND: SYMBOL USED IS CHARACTER N
PLOT OF TIME*AMMO   LEGEND: SYMBOL USED IS CHARACTER A



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM

1 - 2 December 1976

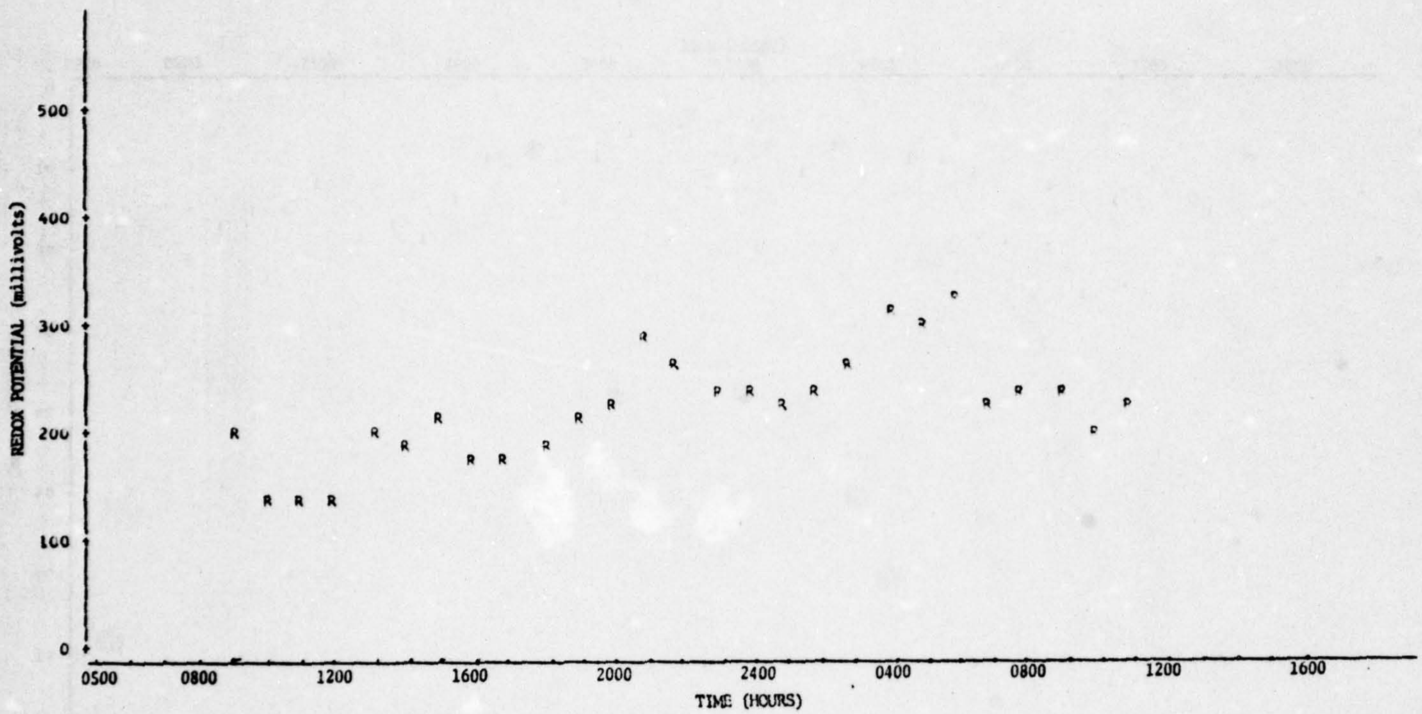
PLOT OF TIME*P   LEGEND: SYMBOL USED IS *



A50

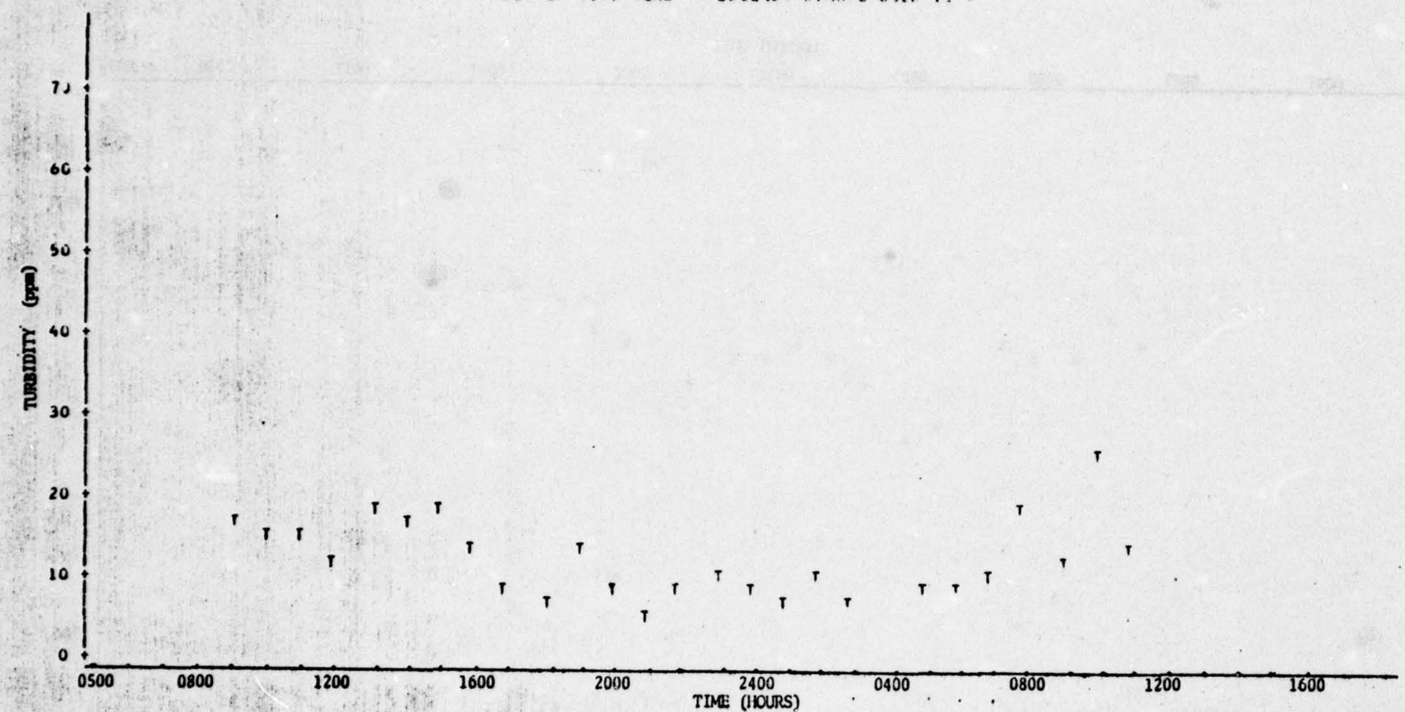
1 - 2 December 1976

PLOT OF TIME*REDOX LEGEND: SYMBOL USED IS R



1 - 2 December 1976

PLOT OF TIME*TURB   LEGEND: SYMBOL USED IS T

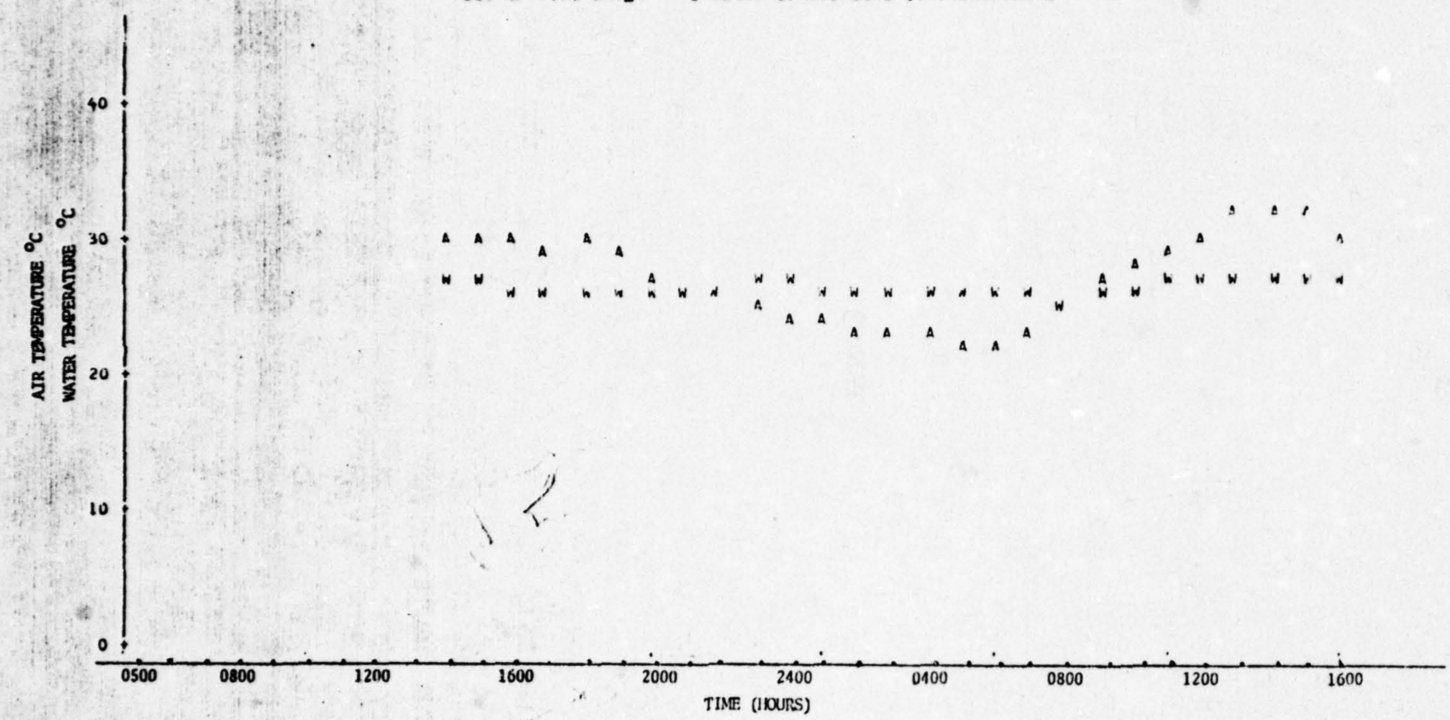


PART 3

PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM 1

27 - 28 May 1975

PLOT OF TIME*AIR_T LEGEND: SYMBOL USED IS CHARACTER A
PLOT OF TIME*WAT_T LEGEND: SYMBOL USED IS CHARACTER W

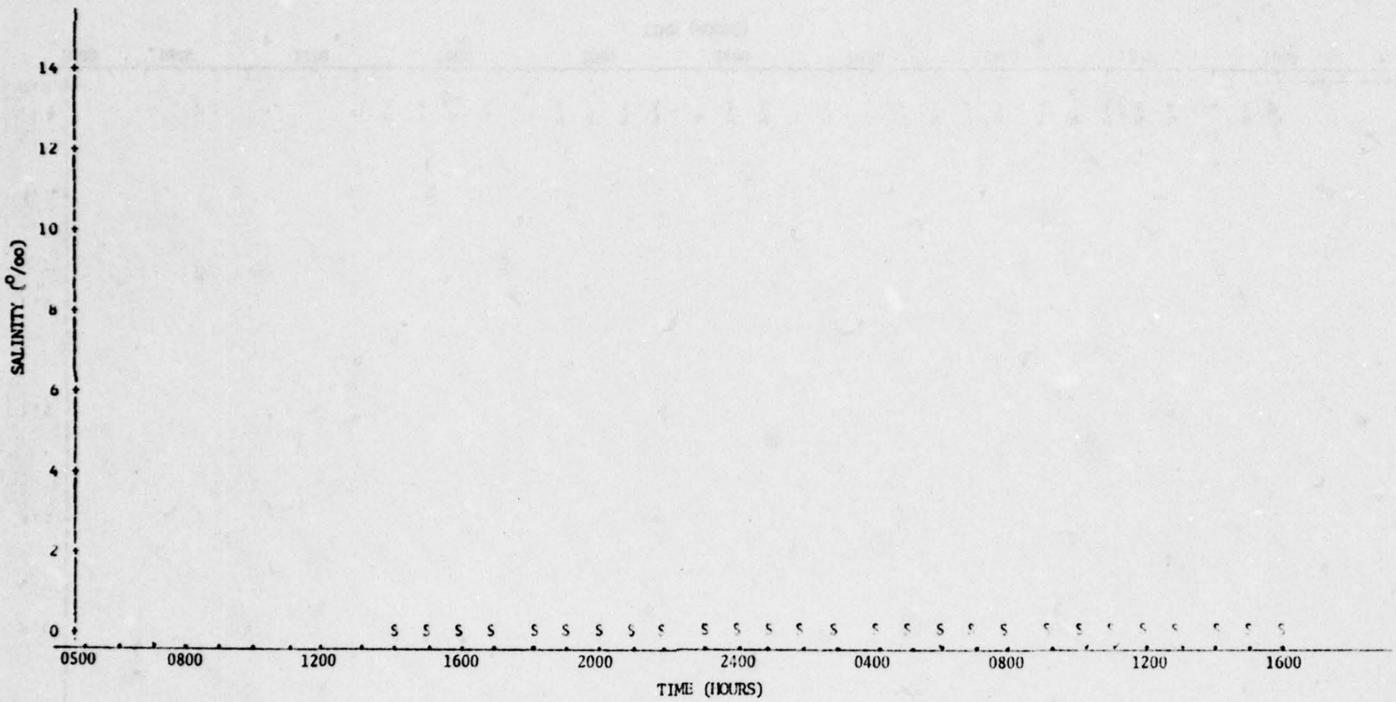


A54

PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM   2

27 - 28 May 1975

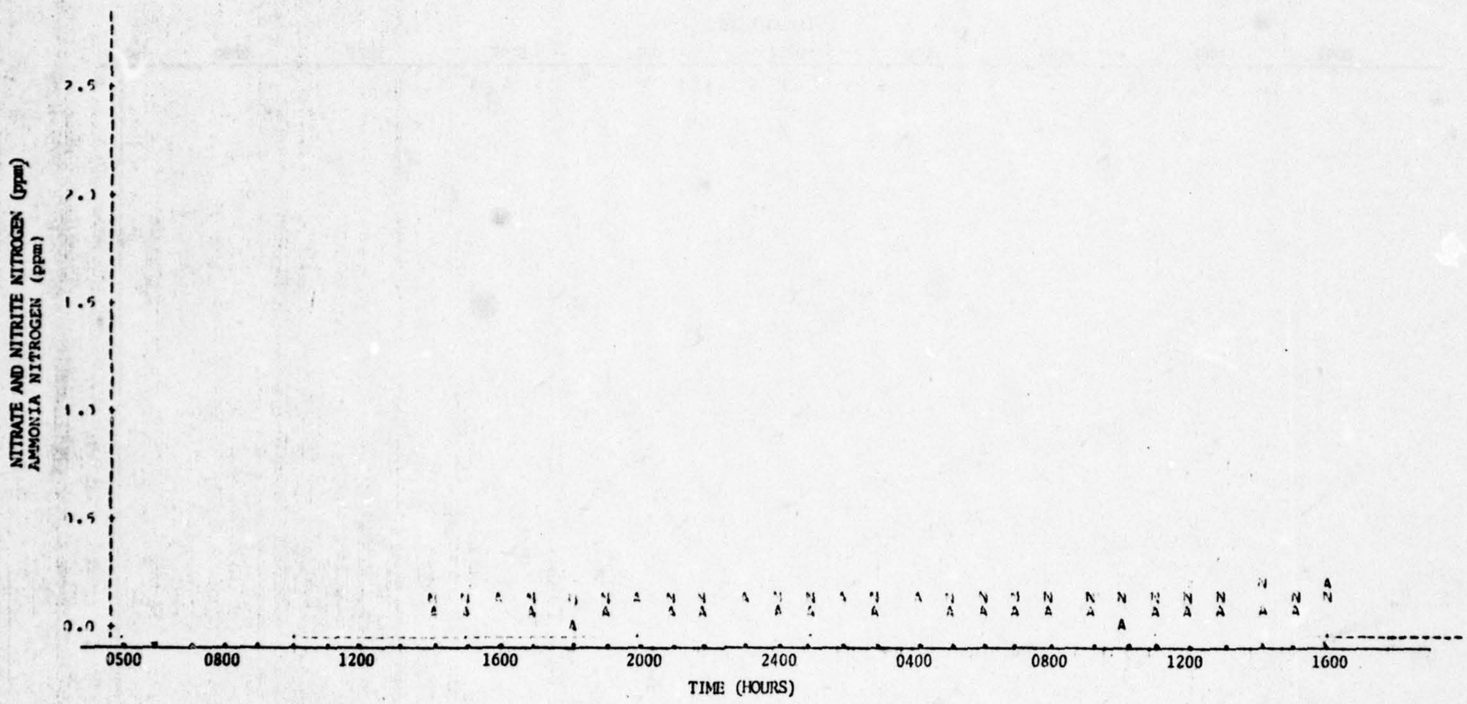
PLOT OF TIME*SAL   LEGEND: SYMBOL USED IS S



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM   3

27 - 28 May 1975

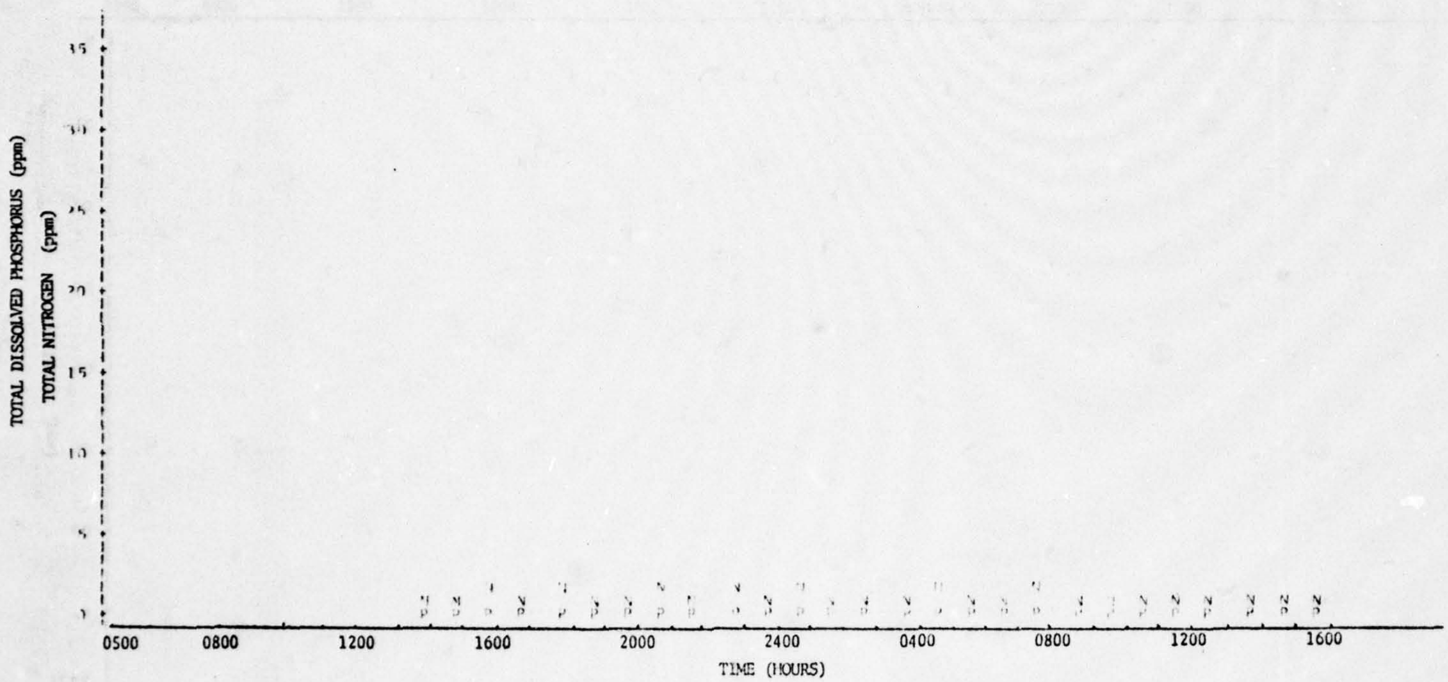
PLOT OF TIME*NITS   LEGEND: SYMBOL USED IS CHARACTER N
PLOT OF TIME*AMMO   LEGEND: SYMBOL USED IS CHARACTER A



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PAGE SCATTER UNIFORM 38

27 - 28 May 1975

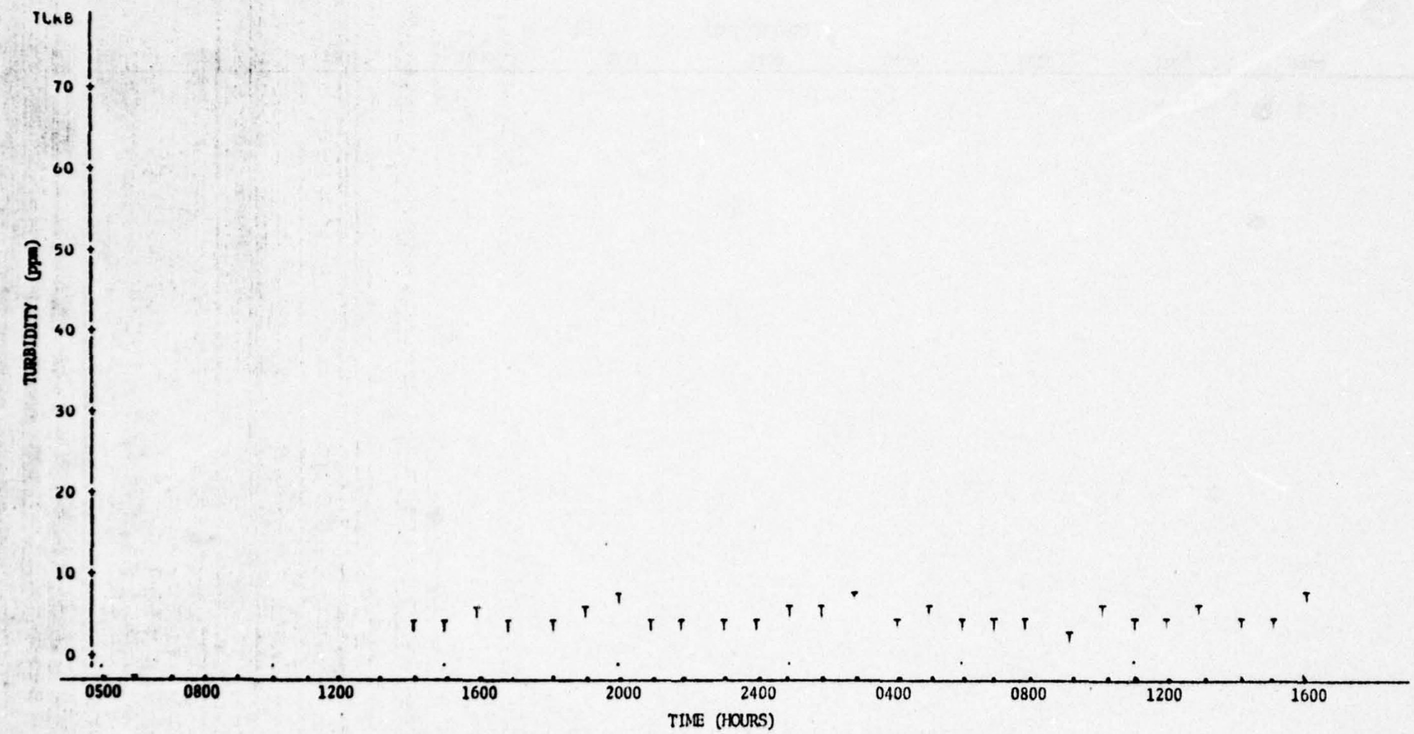
PLOT OF TIME*PHOS LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*TNIT LEGEND: SYMBOL USED IS CHARACTER N



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM

27 - 28 May 1975

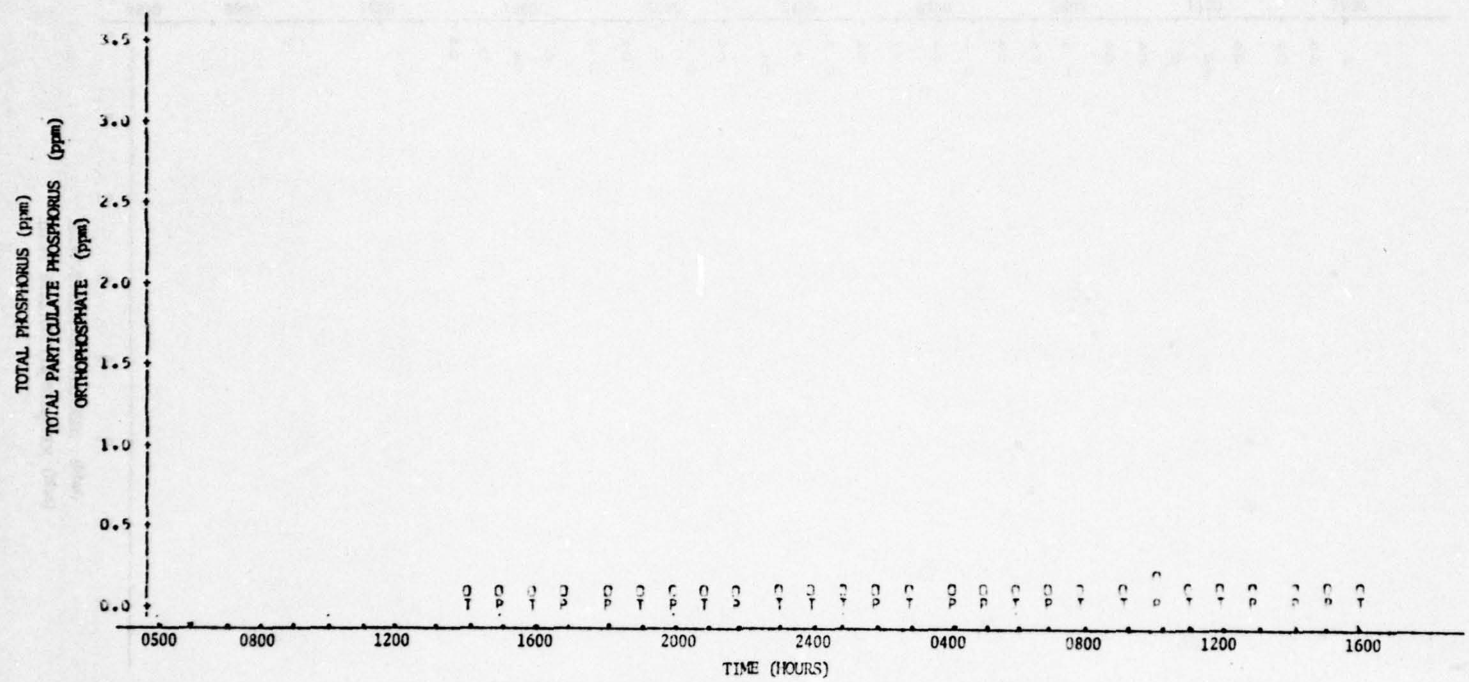
PLOT OF TIME*TURB   LEGEND: SYMBOL USED IS T



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM   86

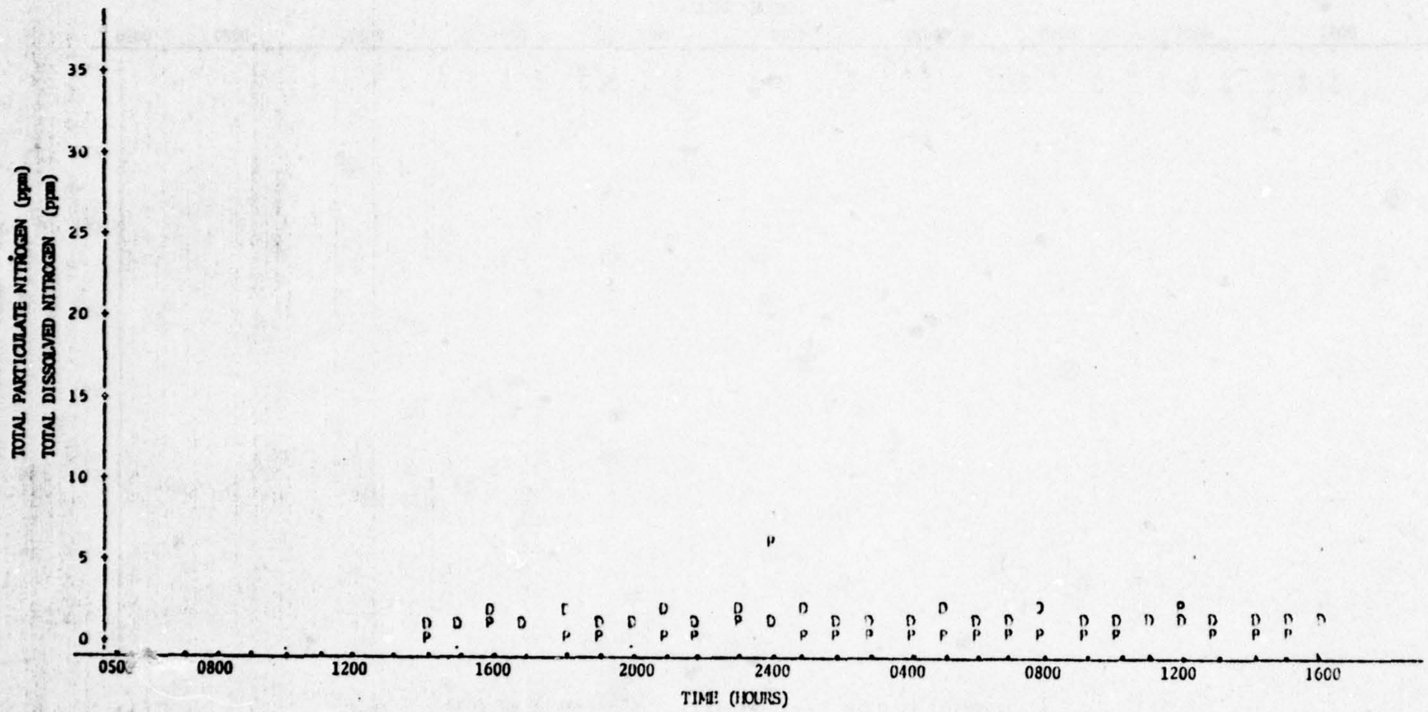
27 - 28 May 1975

PLOT OF TIME*TPHOS   LEGEND: SYMBOL USED IS CHARACTER T
PLOT OF TIME*PPHOS   LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*OPHOS   LEGEND: SYMBOL USED IS CHARACTER O



27 - 28 May 1975

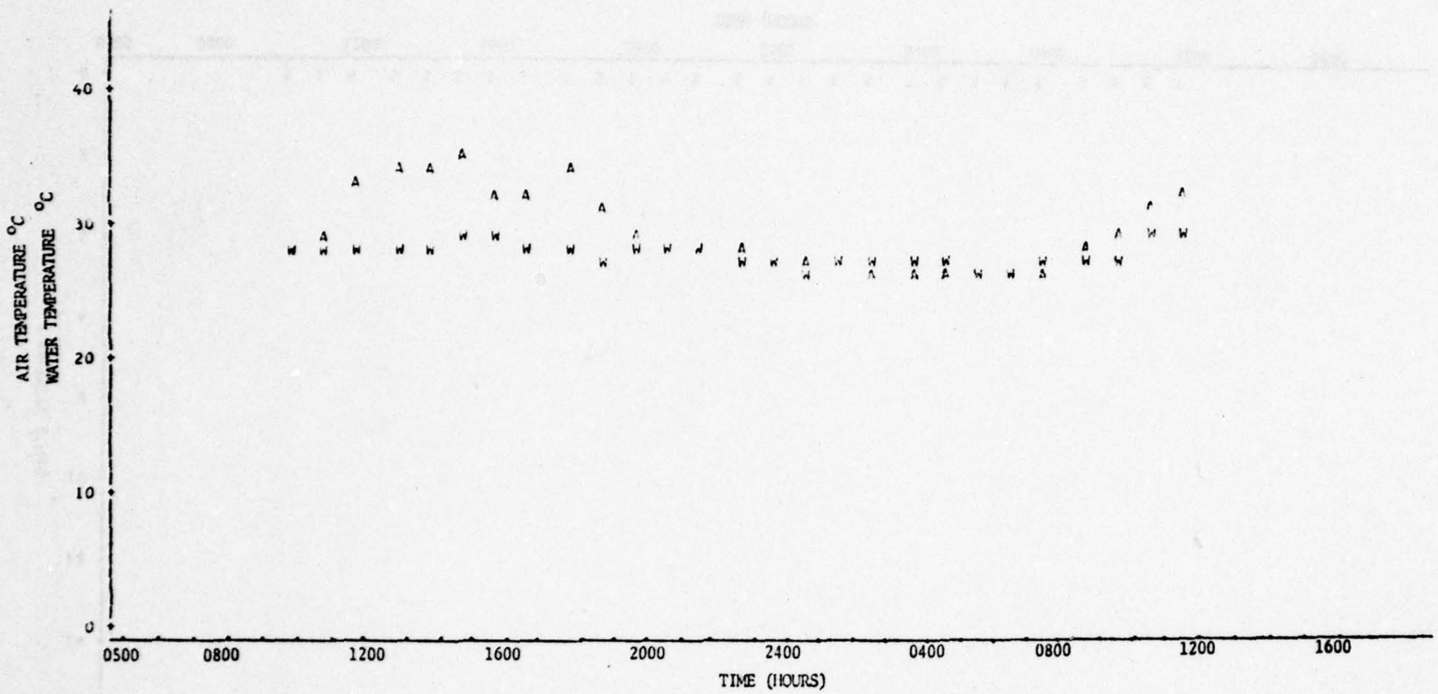
PLOT OF TIME*PNIT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*DNIT LEGEND: SYMBOL USED IS CHARACTER D



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM 3

23 - 24 July 1975

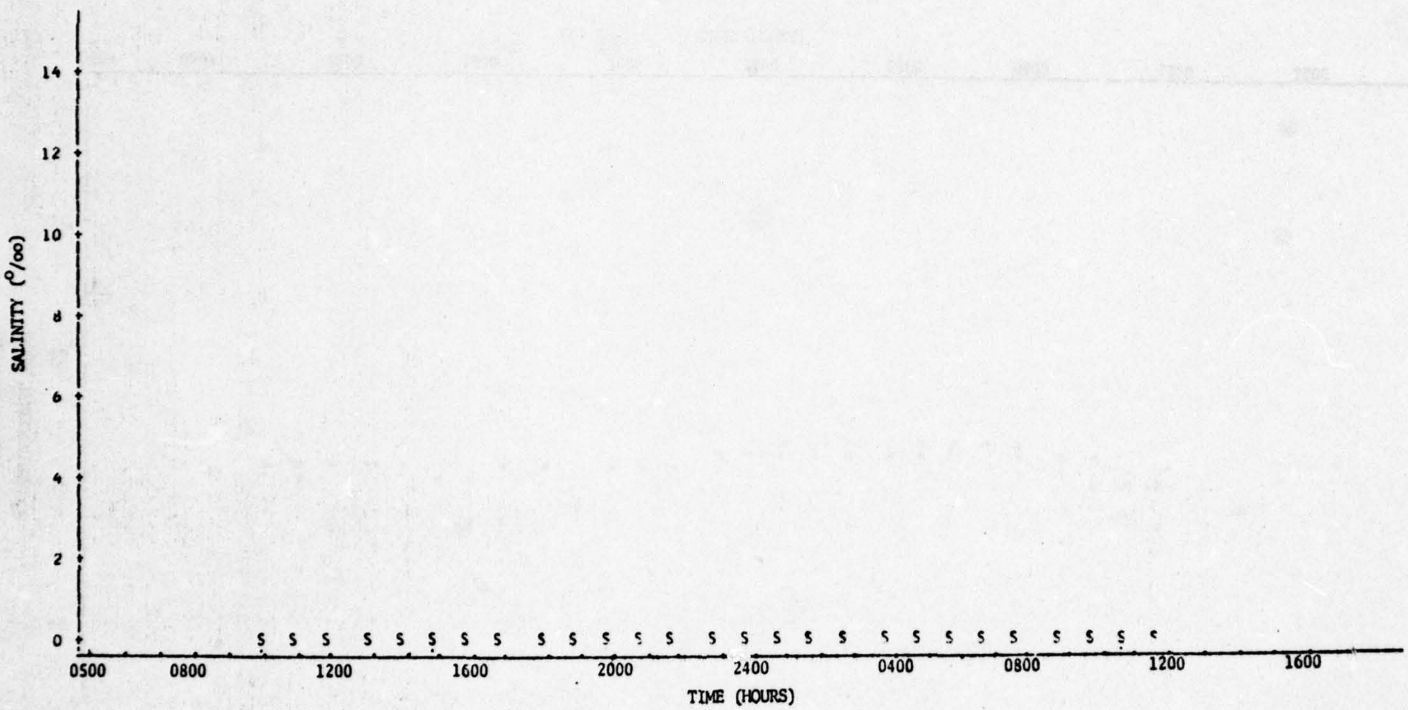
PLOT OF TIME*AIR_T LEGEND: SYMBOL USED IS CHARACTER A
PLOT OF TIME*WAT_T LEGEND: SYMBOL USED IS CHARACTER W



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM 4

23 - 24 July 1975

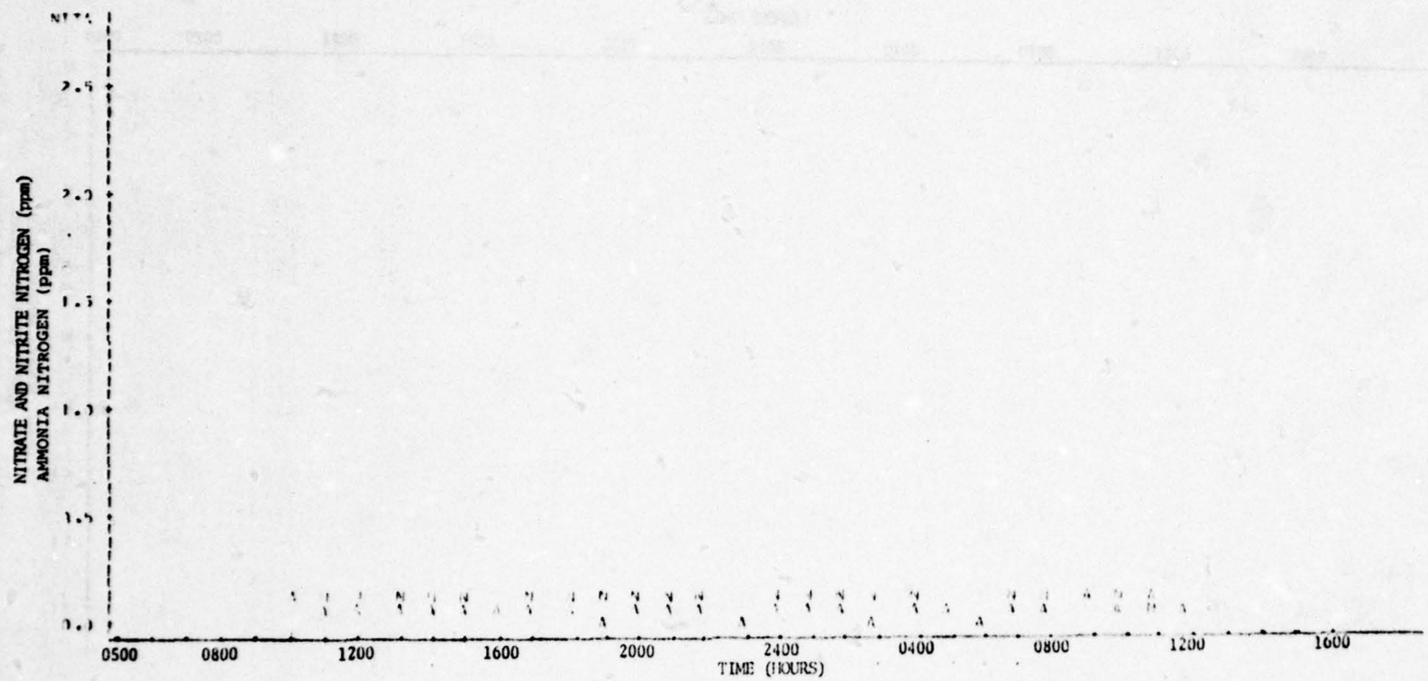
PLOT OF TIME*SAL LEGEND: SYMBOL USED IS S



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

23 - 24 July 1975

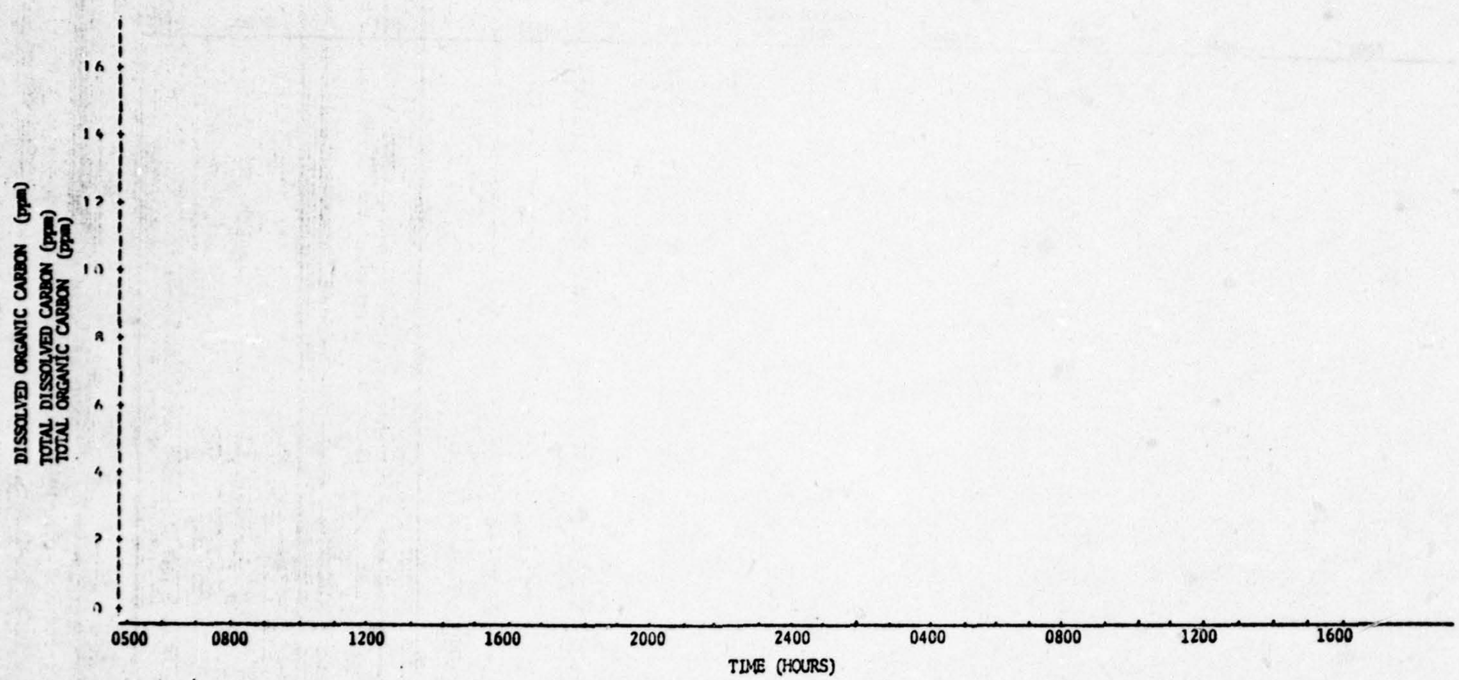
PLOT OF TIME*NITA LEGEND: SYMBOL USED IS CHARACTER N
PLOT OF TIME*AMMO LEGEND: SYMBOL USED IS CHARACTER A



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM

23 - 24 July 1975

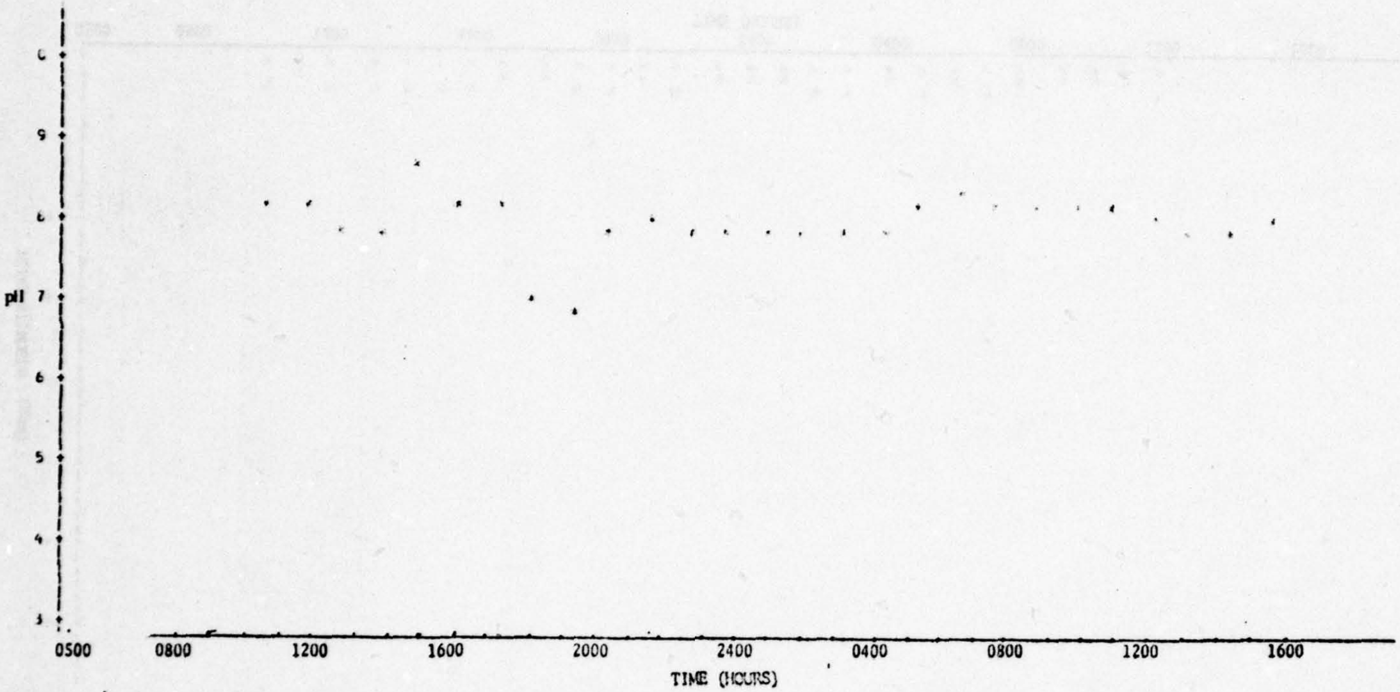
PLOT OF TIME*DOC   LEGEND: SYMBOL USED IS CHARACTER D
PLOT OF TIME*TDC   LEGEND: SYMBOL USED IS CHARACTER T
PLOT OF TIME*TOC   LEGEND: SYMBOL USED IS CHARACTER O



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

23 - 24 July 1975

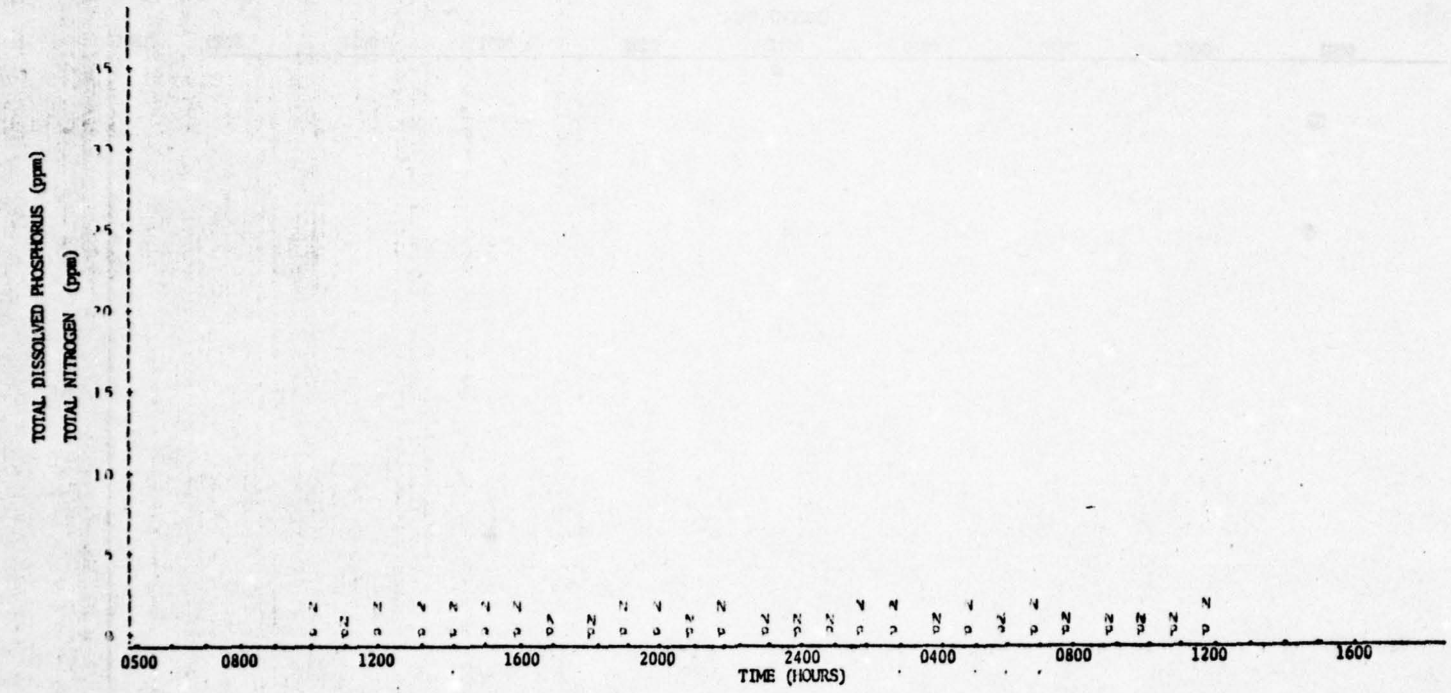
PLOT OF TIMEXP LEGEND: SYMBOL USED IS



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

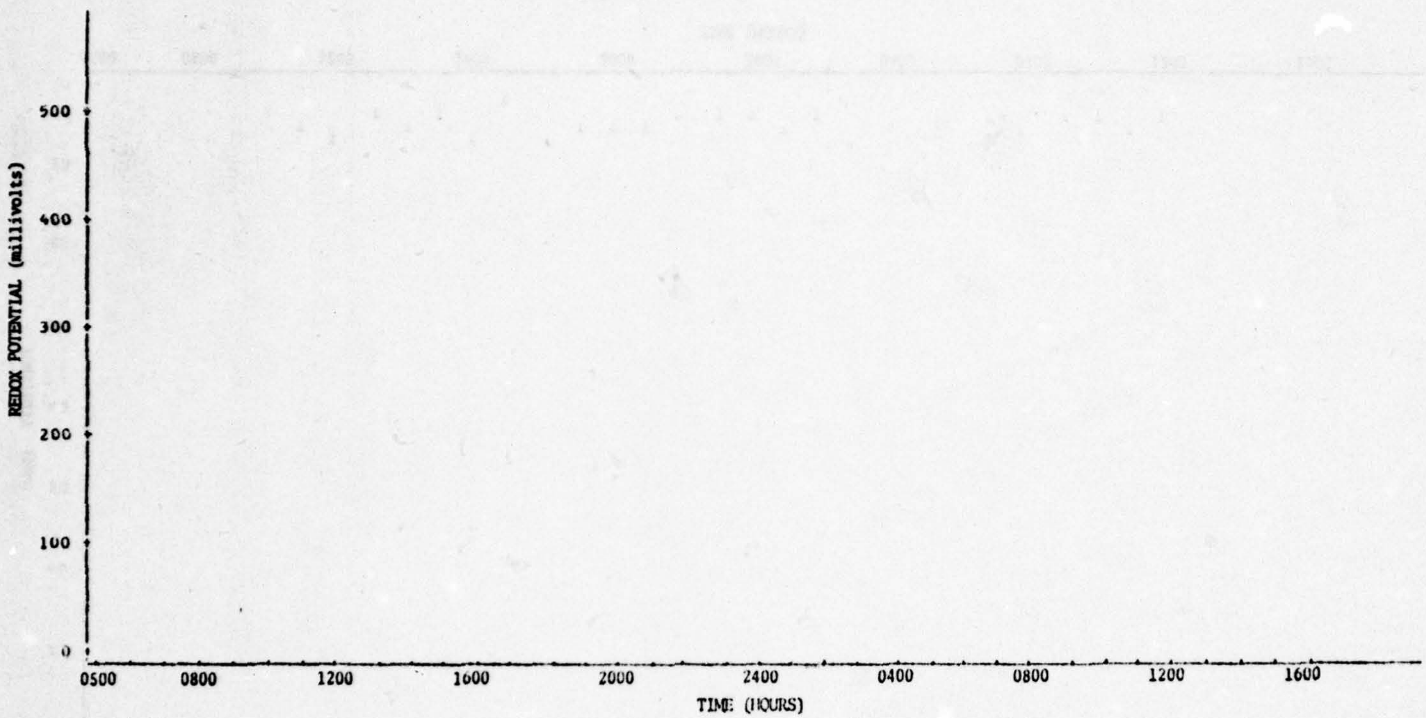
23 - 24 July 1975

PLOT OF TIME*DPHOS LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*TNIT LEGEND: SYMBOL USED IS CHARACTER N



23 - 24 July 1975

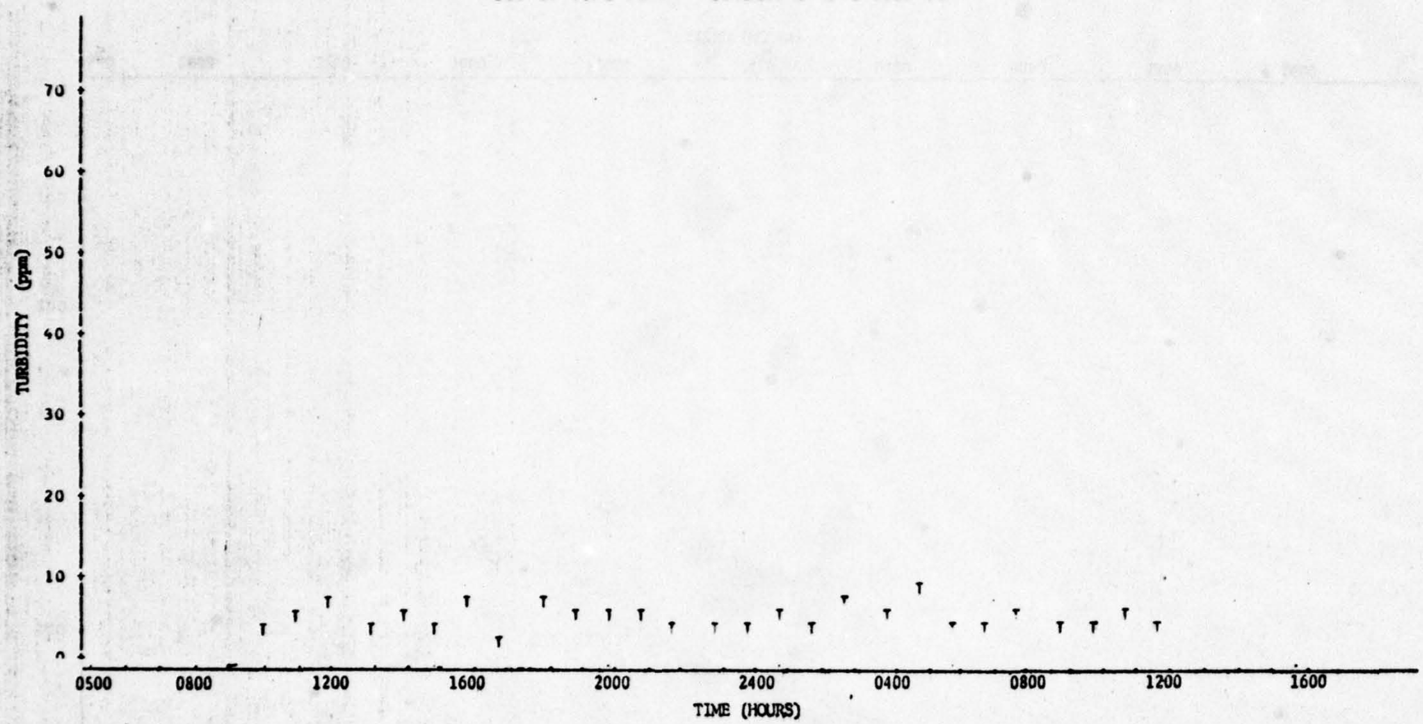
PLOT OF TIME*REDOX LEGEND: SYMBOL USED IS P



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

23 - 24 July 1975

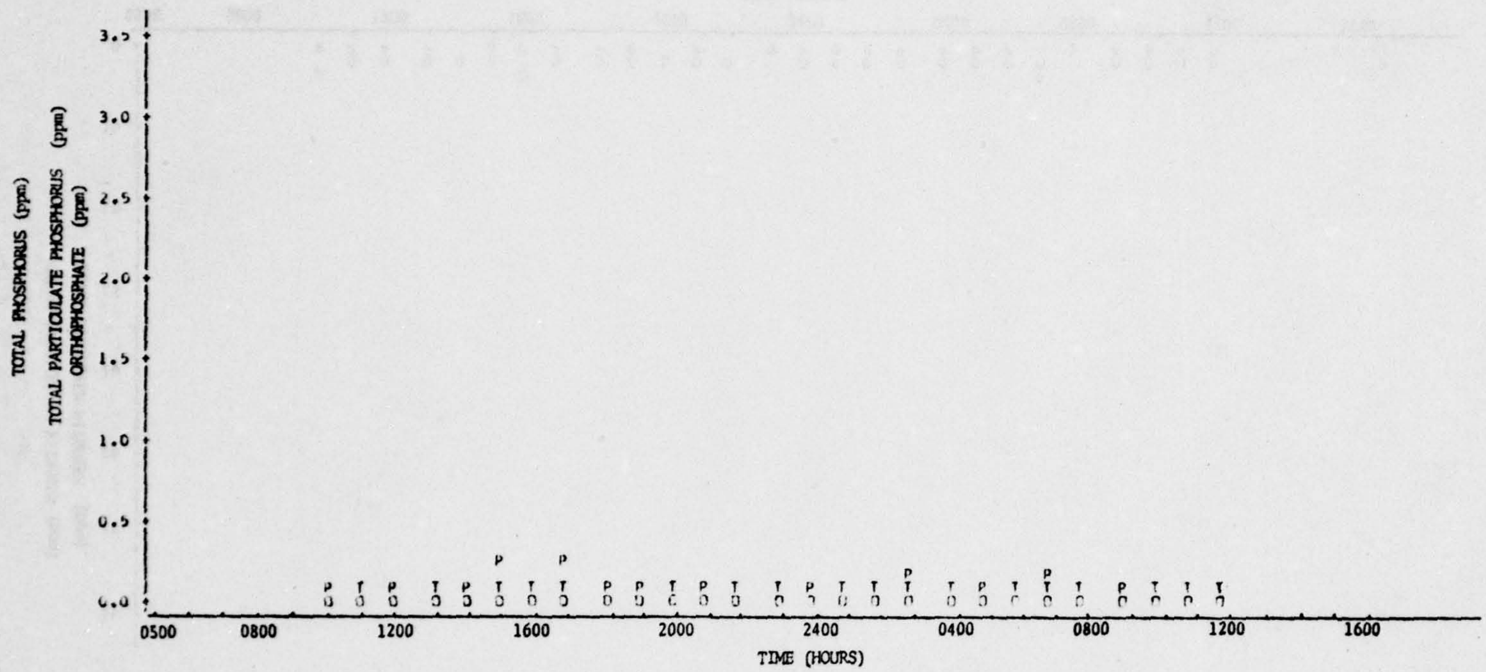
PLOT OF TIME*TURB LEGEND: SYMBOL USED IS T



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM

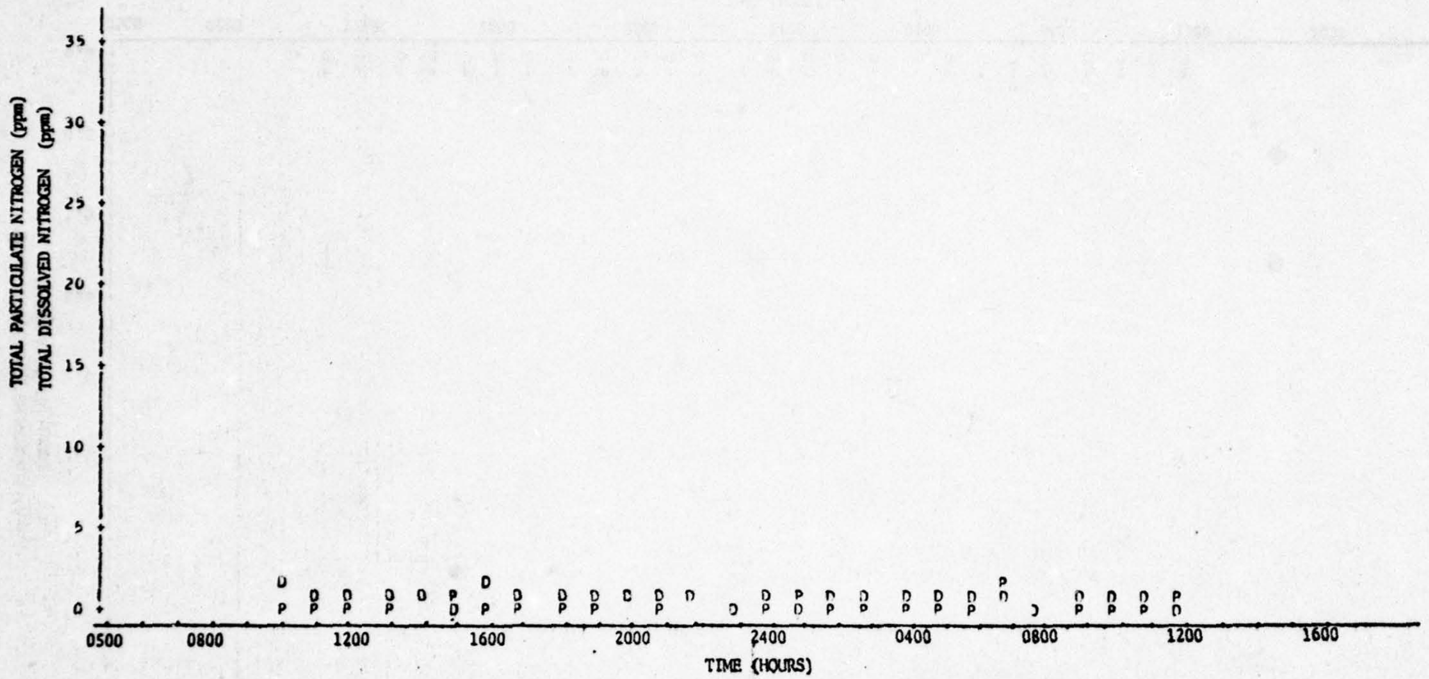
23 - 24 July 1975

PLOT OF TIME*TPHOS   LEGEND: SYMBOL USED IS CHARACTER T
PLOT OF TIME*PPHOS   LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*OPHOS   LEGEND: SYMBOL USED IS CHARACTER O



23 - 24 July 1975

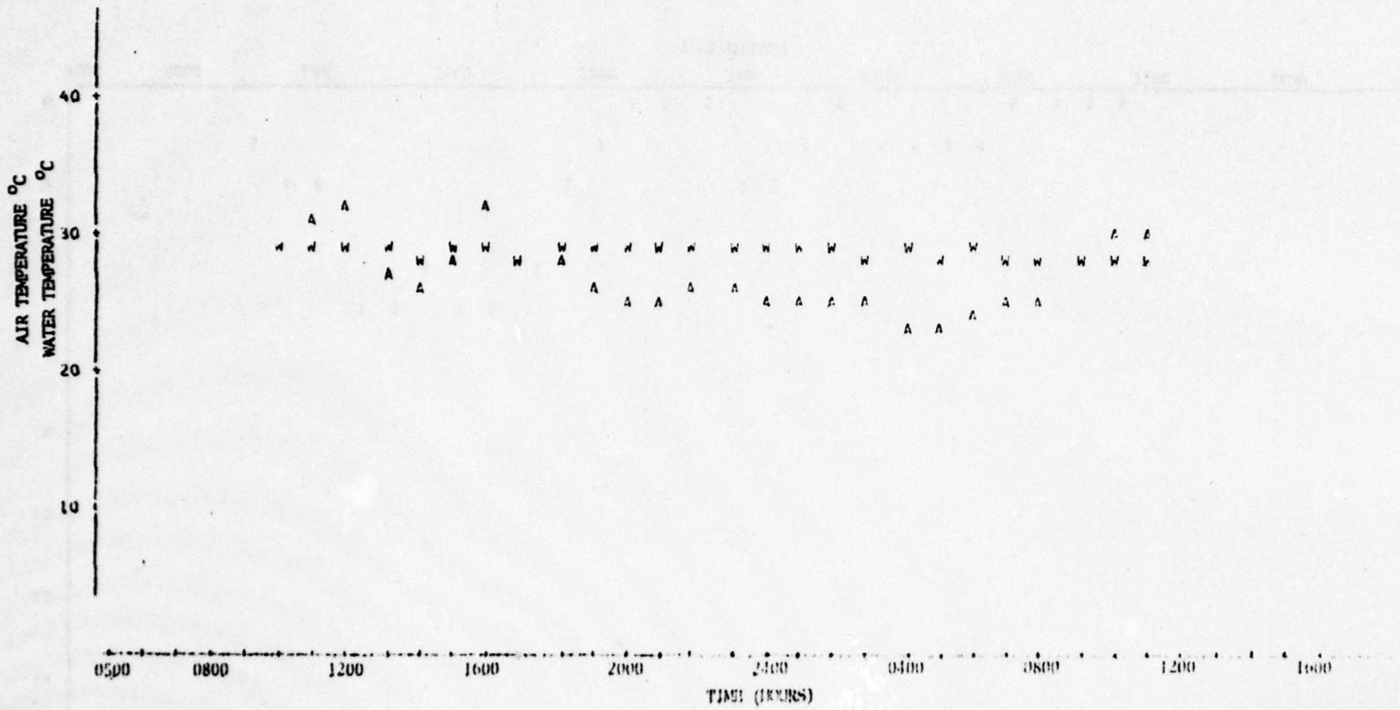
PLOT OF TIME*PNIT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*DNIT LEGEND: SYMBOL USED IS CHARACTER D



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM

10 - 11 September 1975

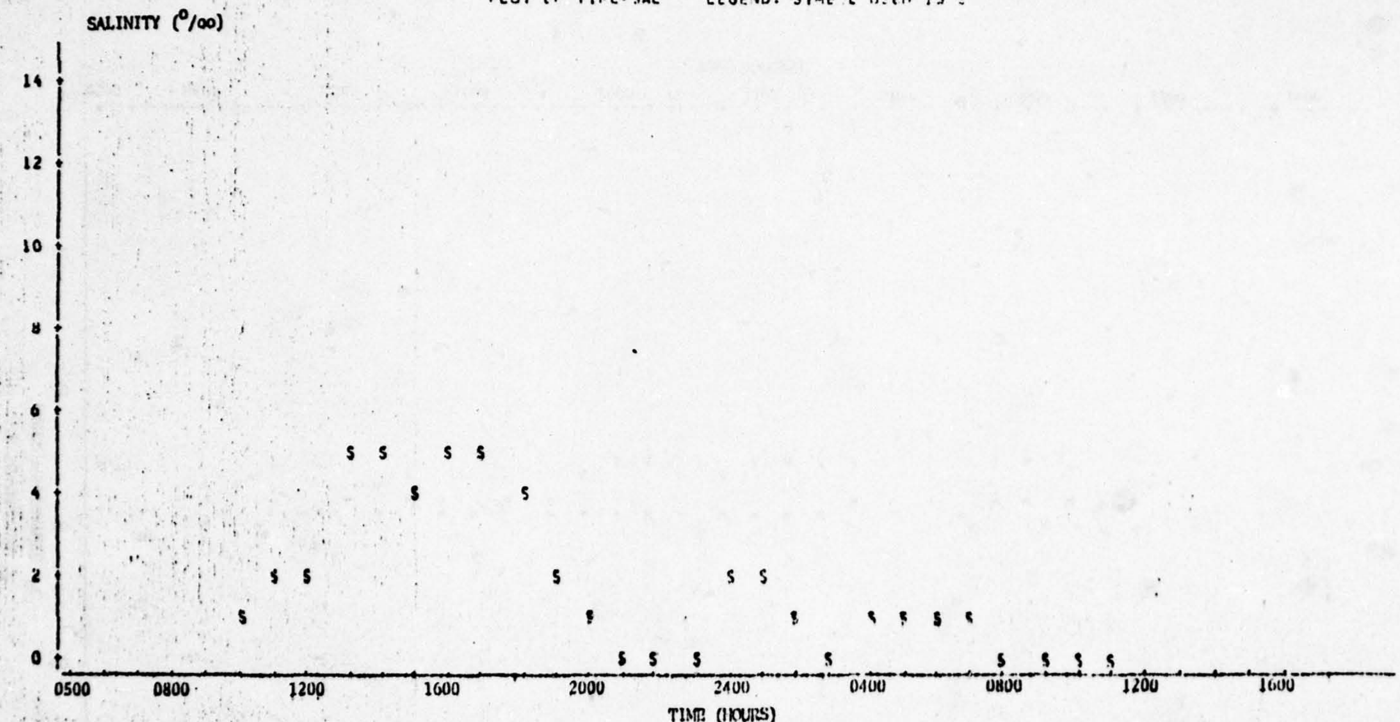
PLOT OF TIME*AIR_T   LEGEND: SYMBOL USED IS CHARACTER A
PLOT OF TIME*WAT_T   LEGEND: SYMBOL USED IS CHARACTER W



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM 6

10 - 11 September 1975

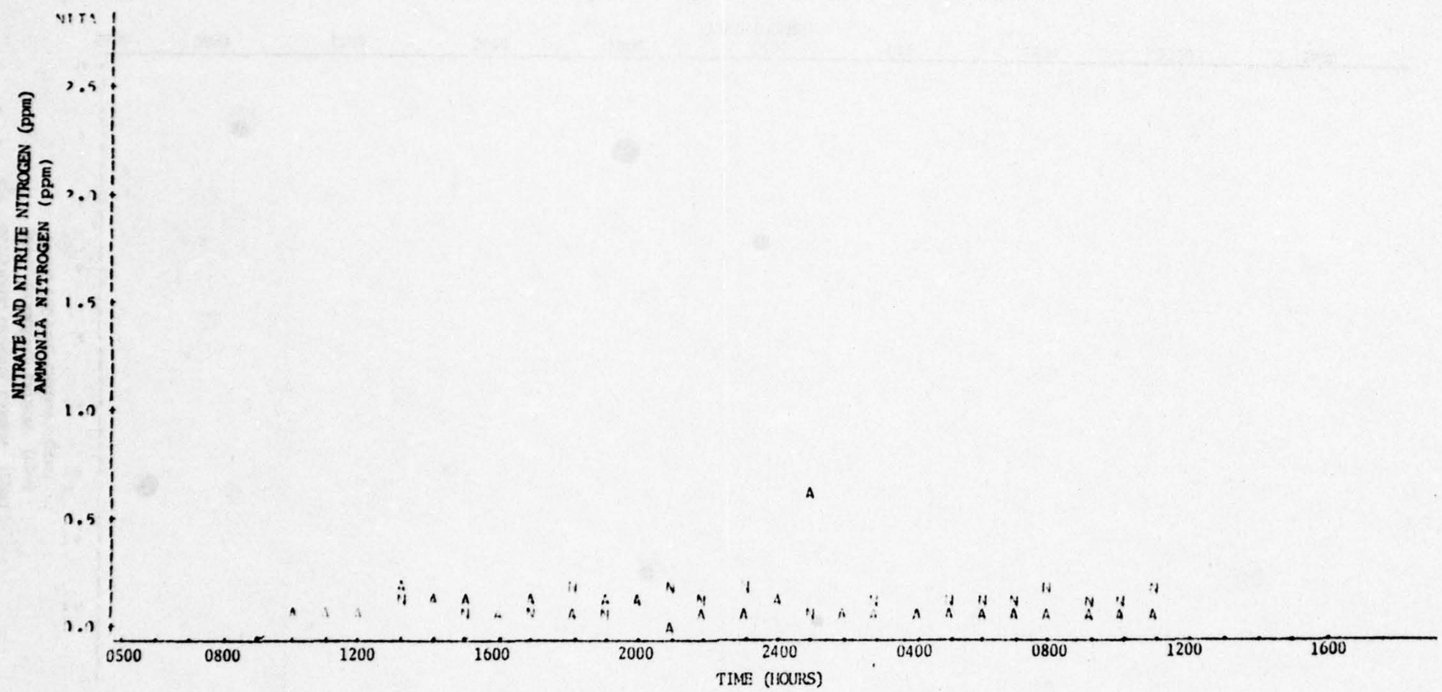
PLOT OF TIME*SAL LEGEND: SYMBOL USED IS S



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM   7

10 - 11 September 1975

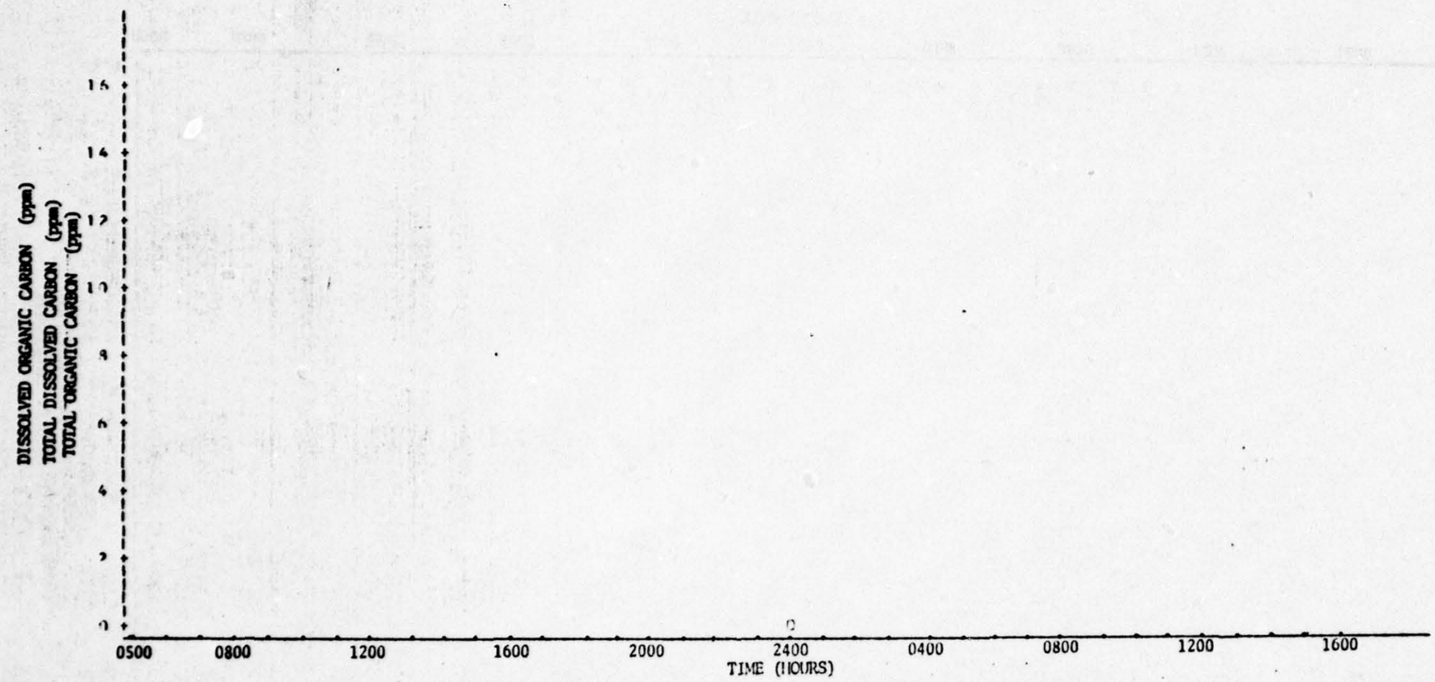
PLOT OF TIME*NITA   LEGEND: SYMBOL USED IS CHARACTER N
PLOT OF TIME*AMMO   LEGEND: SYMBOL USED IS CHARACTER A



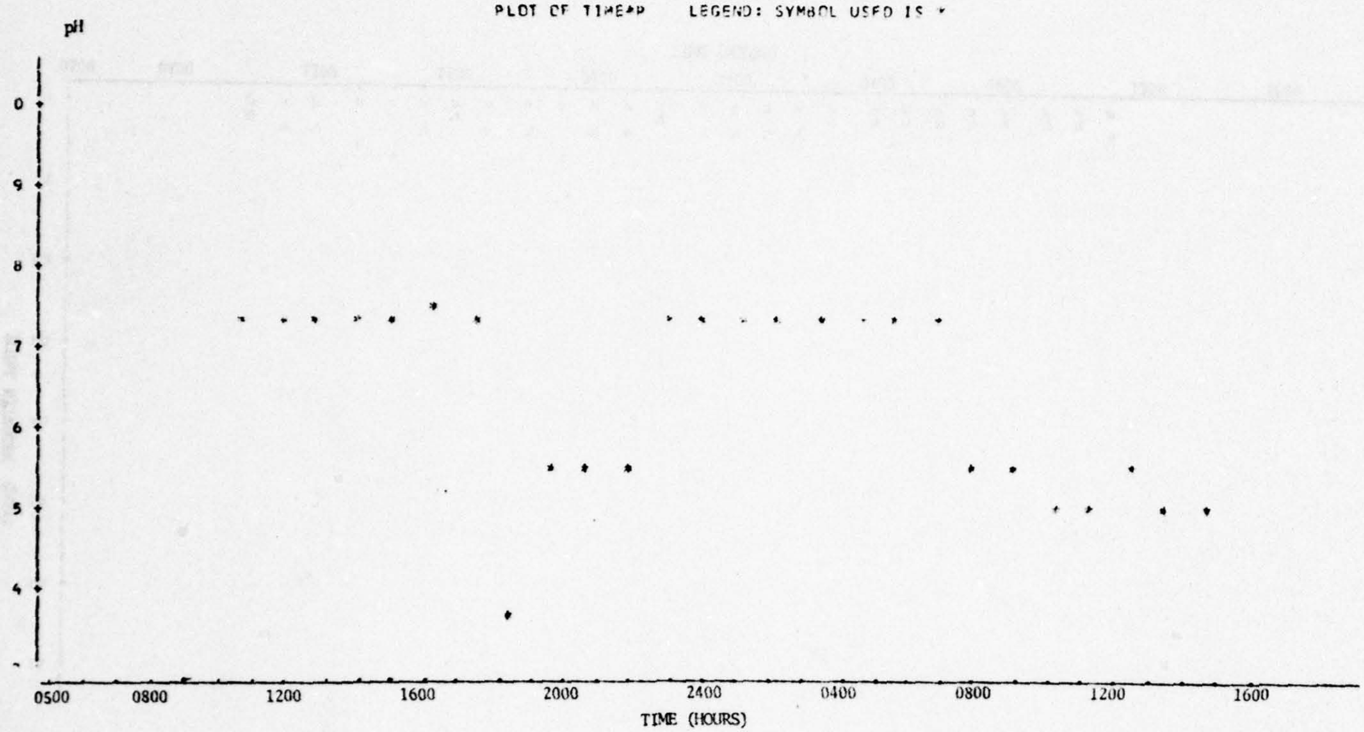
PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM 8

10 - 11 September 1975

PLOT OF TIME*DOC LEGEND: SYMBOL USED IS CHARACTER D
PLOT OF TIME*TDC LEGEND: SYMBOL USED IS CHARACTER T
PLOT OF TIME*TOC LEGEND: SYMBOL USED IS CHARACTER O



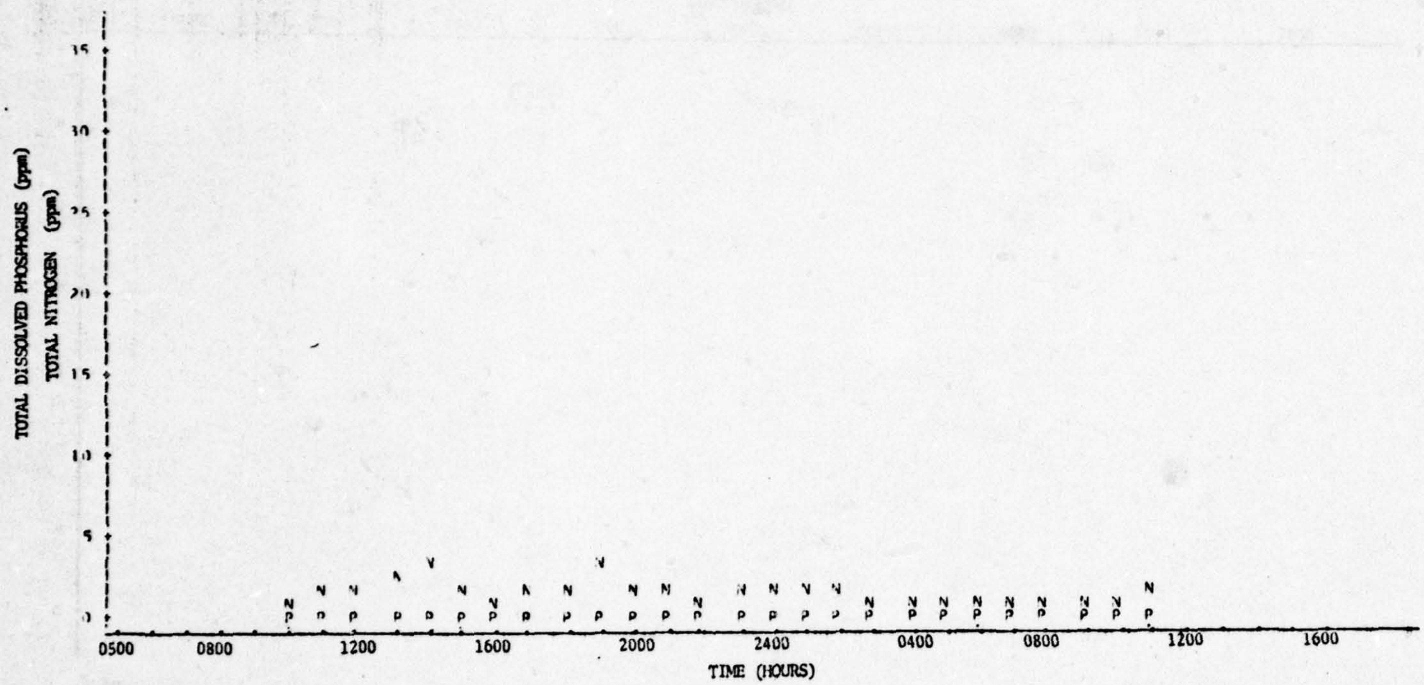
PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM
10 - 11 September 1975
PLOT OF TIME*P LEGEND: SYMBOL USED IS *



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM   40

10 - 11 September 1975

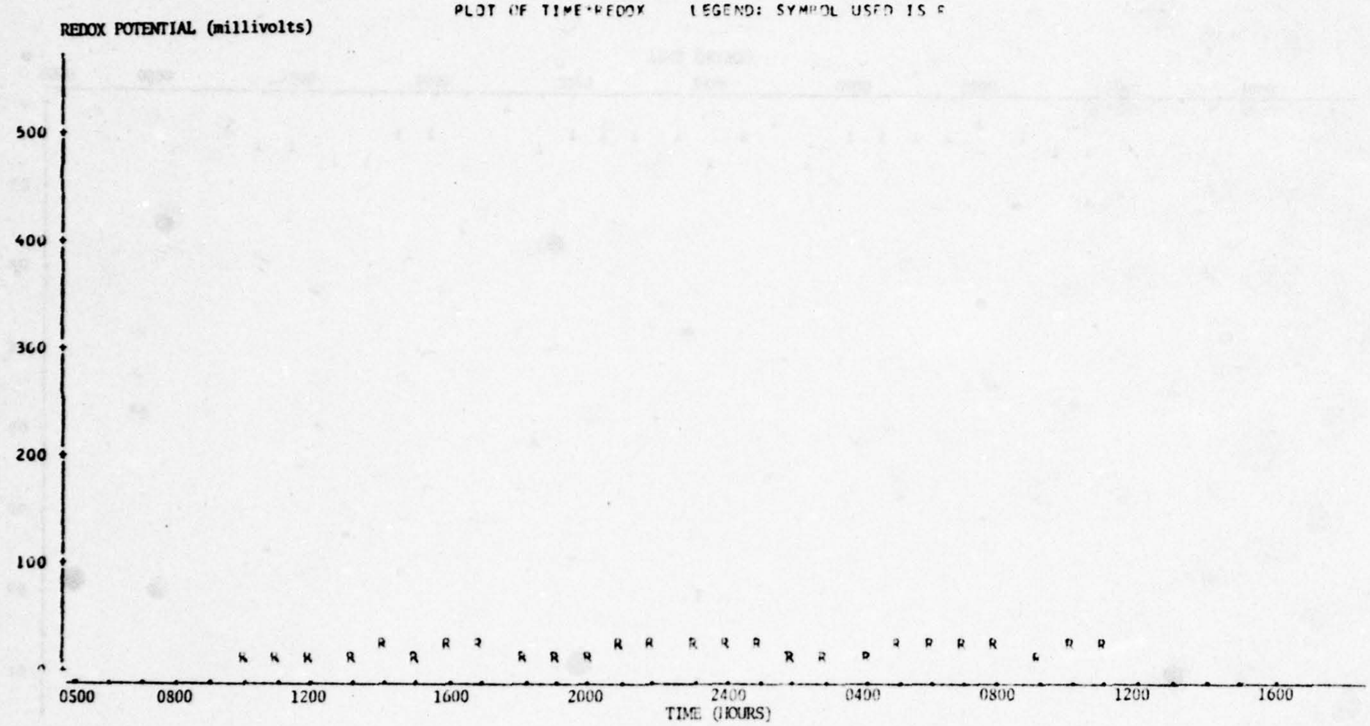
PLOT OF TIME*TDPHOS   LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*TNIT   LEGEND: SYMBOL USED IS CHARACTER N



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM

10 - 11 September 1975

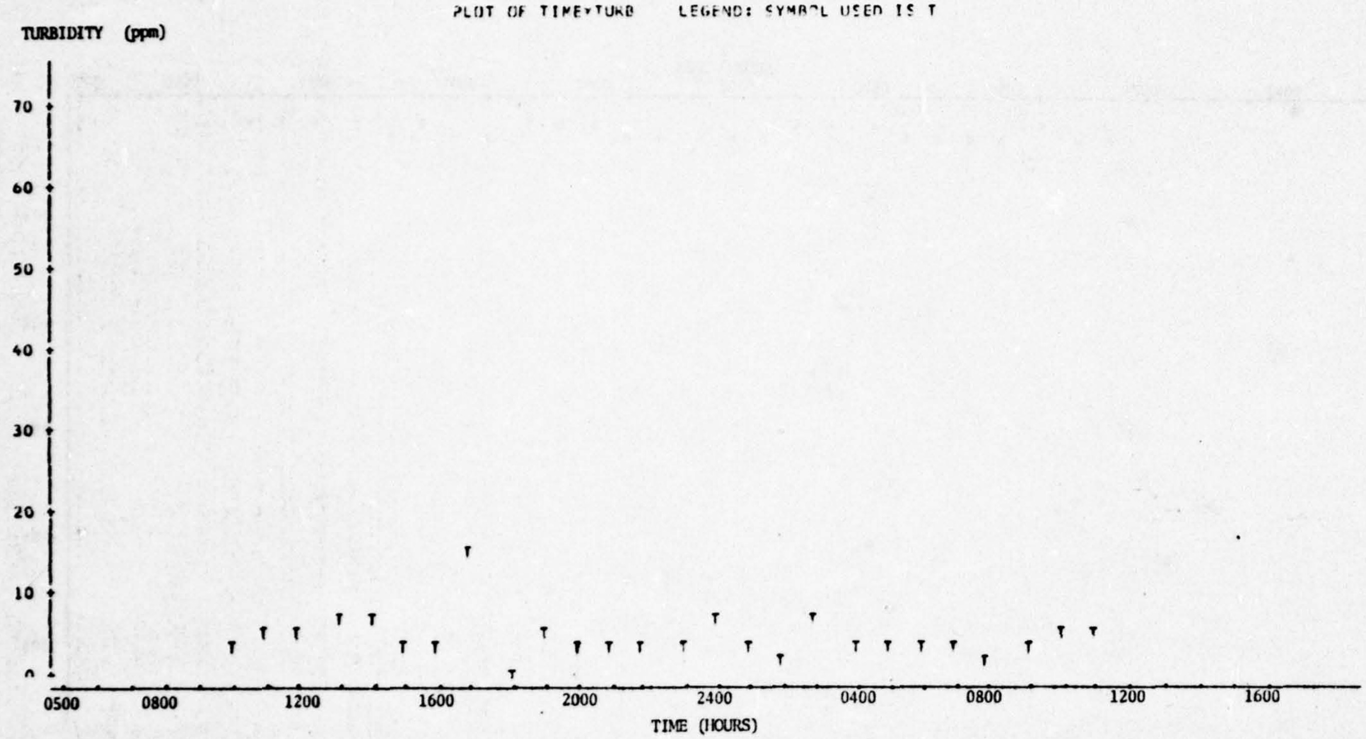
PLOT OF TIME*REDOX   LEGEND: SYMBOL USED IS R



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM

10 - 11 September 1975

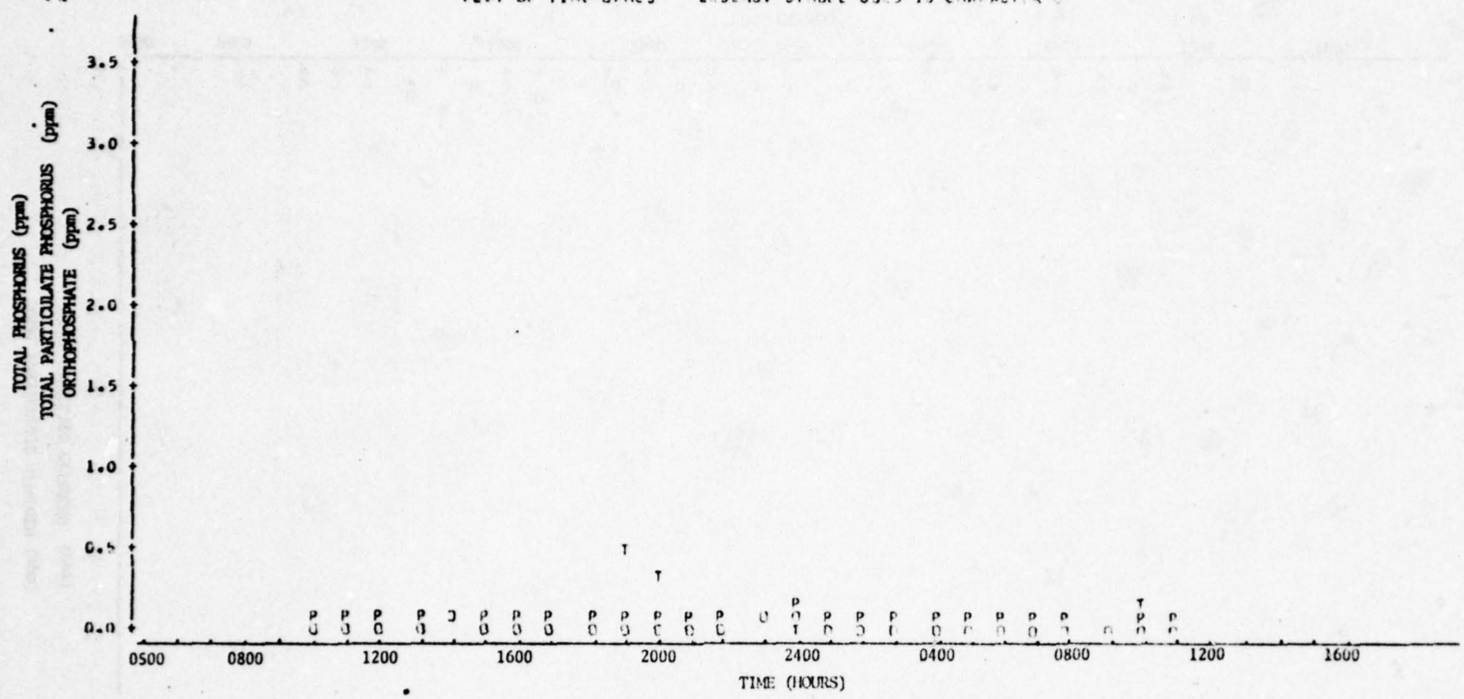
PLOT OF TIME*TURB   LEGEND: SYMBOL USED IS T



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM   88

10 - 11 September 1975

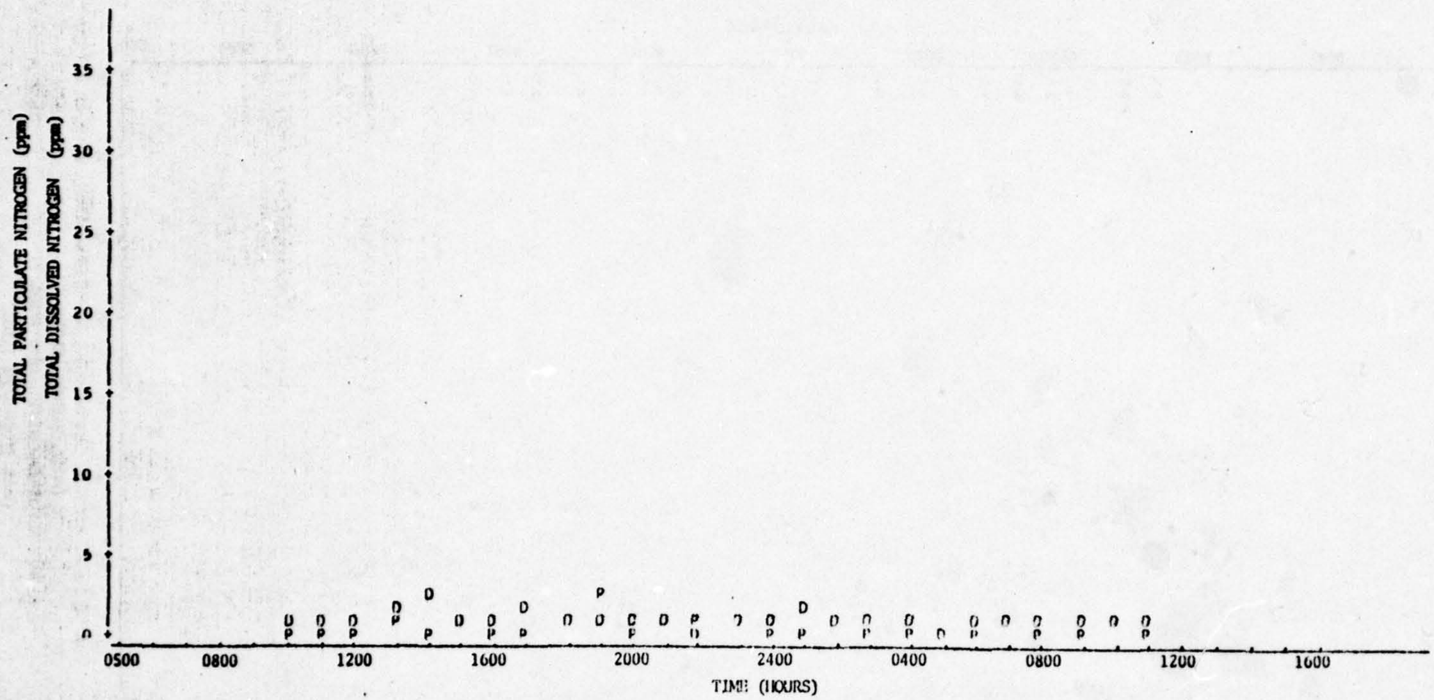
PLOT OF TIME*TPHOS   LEGEND: SYMBOL USED IS CHARACTER T
PLOT OF TIME*PPHOS   LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*OPHOS   LEGEND: SYMBOL USED IS CHARACTER O



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

10 - 11 September 1975

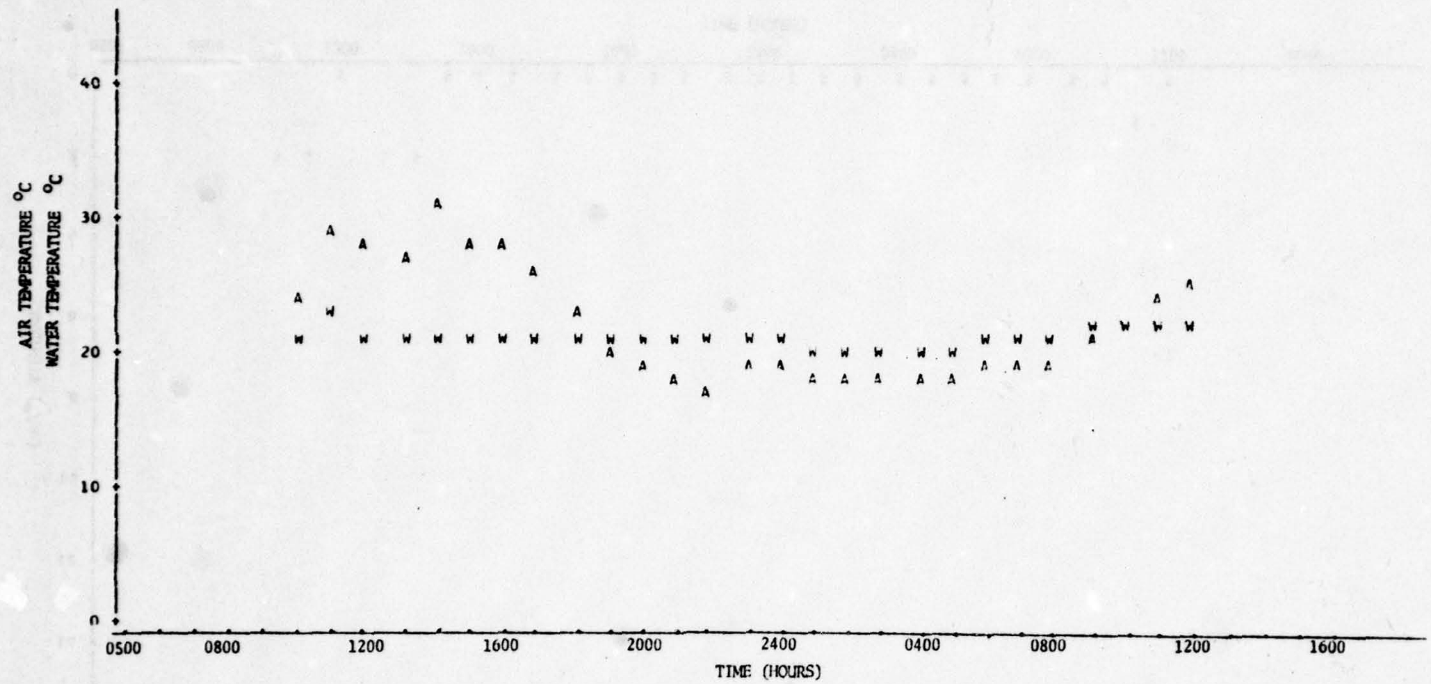
PLOT OF TIME*PNIT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*DNIT LEGEND: SYMBOL USED IS CHARACTER D



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

5 - 6 November 1975

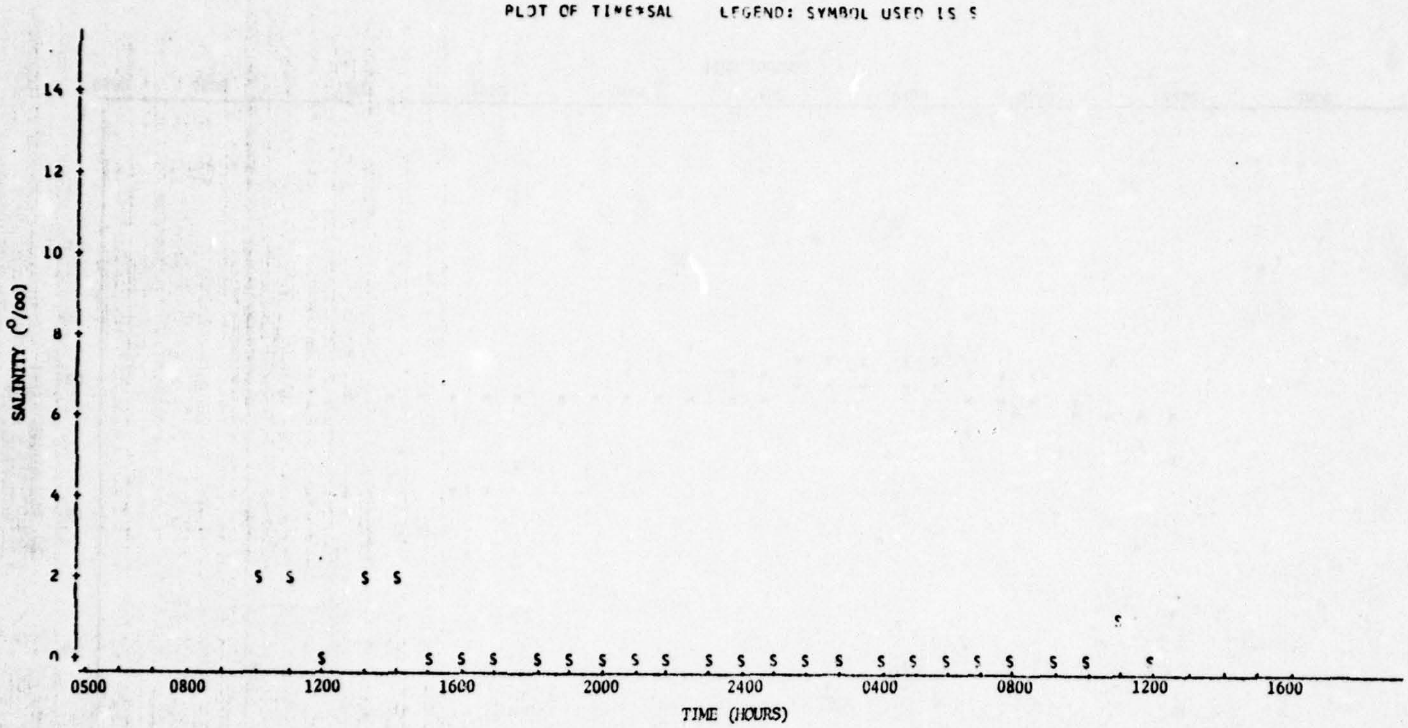
PLOT OF TIME*AIR_T LEGEND: SYMBOL USED IS CHARACTER A
PLOT OF TIME*WAT_T LEGEND: SYMBOL USED IS CHARACTER W



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM

5 - 6 November 1975

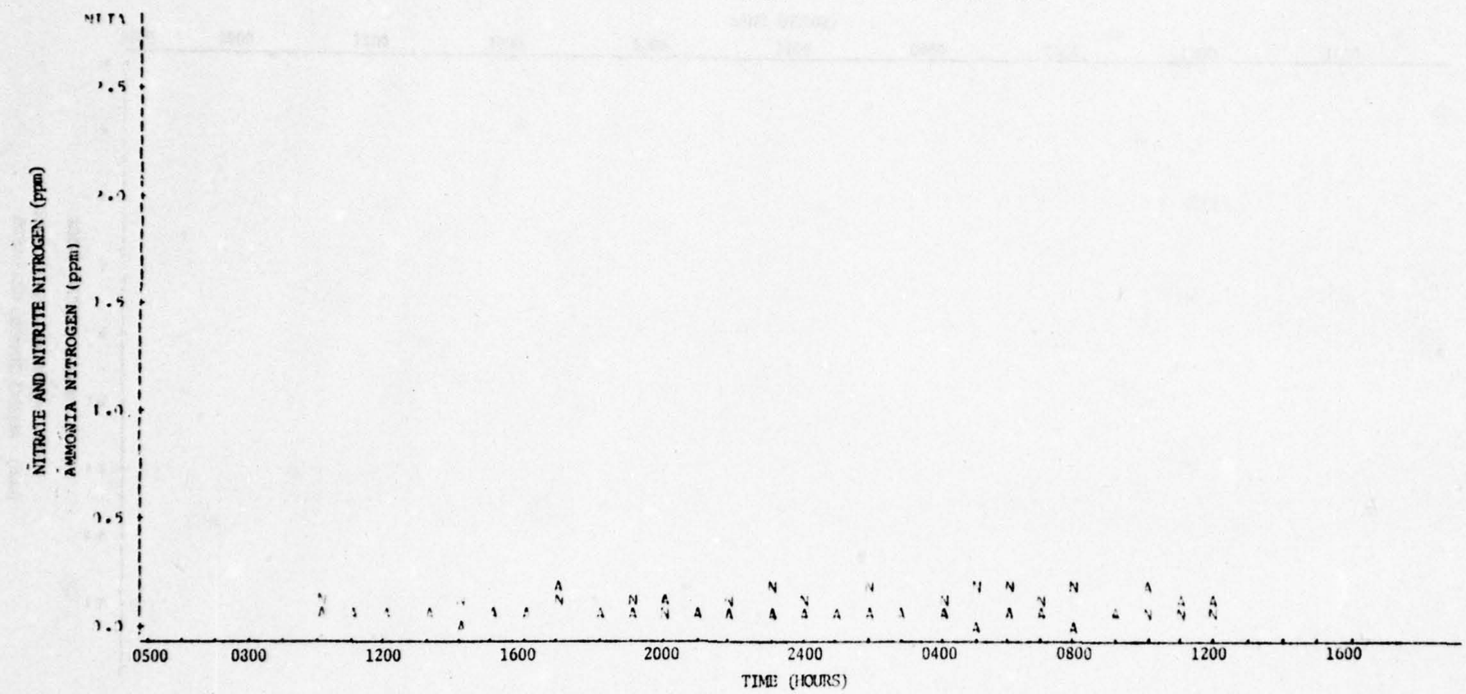
PLOT OF TIME*SAL   LEGEND: SYMBOL USED IS S



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM 9

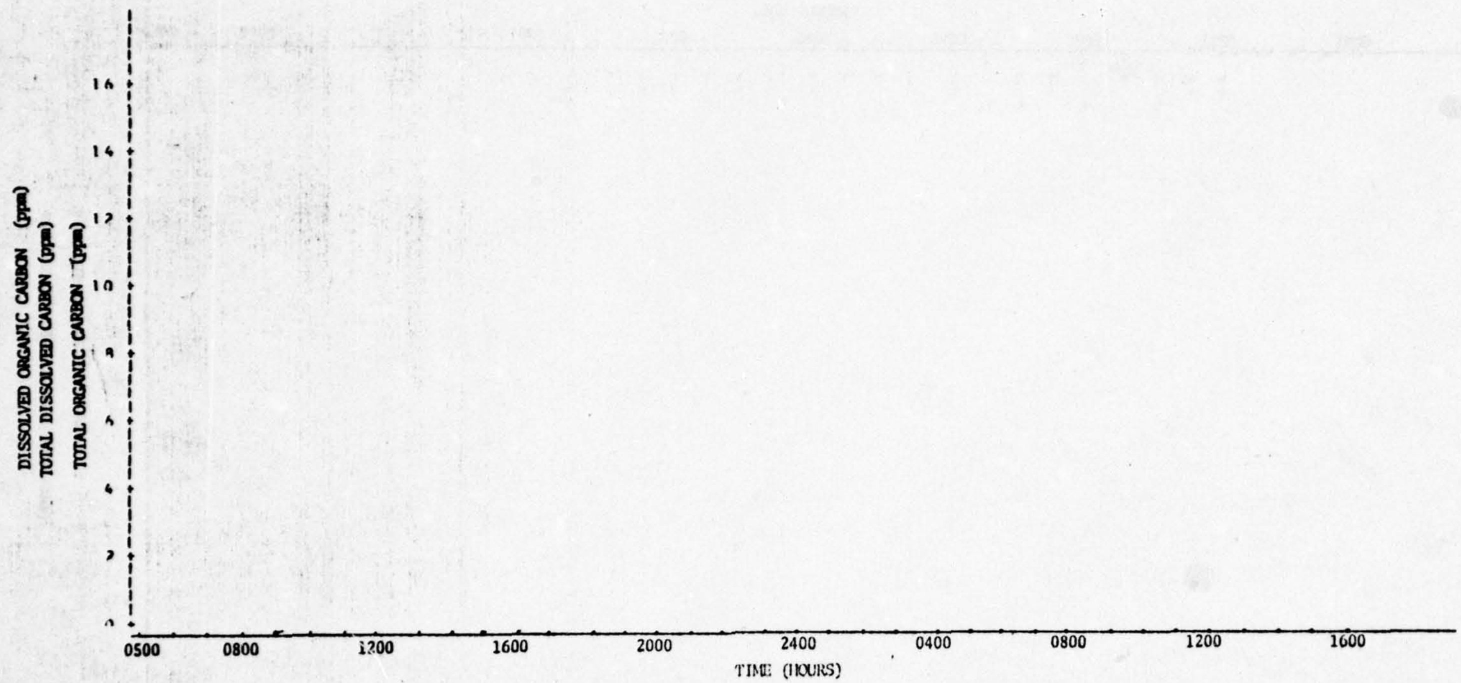
5 - 6 November 1975

PLOT OF TIME*NITA LEGEND: SYMBOL USED IS CHARACTER N
PLOT OF TIME*AMMO LEGEND: SYMBOL USED IS CHARACTER A



5 - 6 November 1975

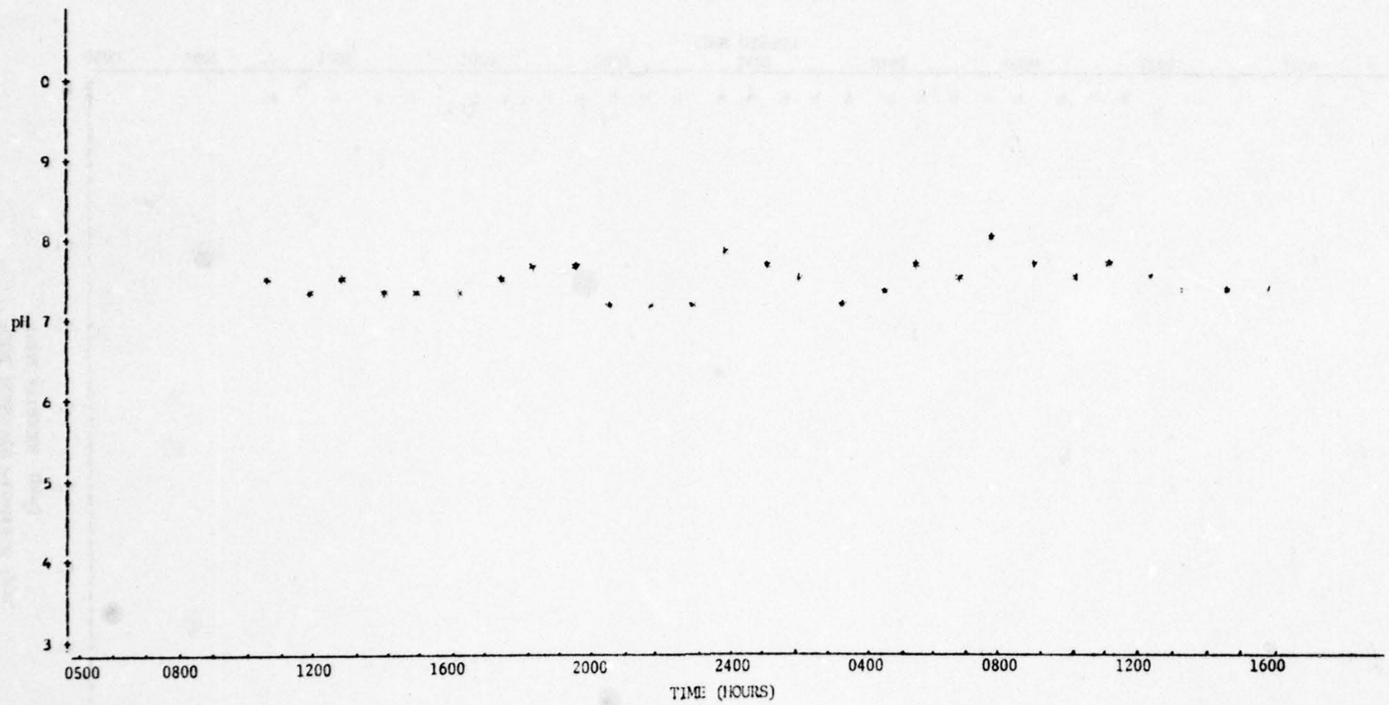
PLOT OF TIME*DOC LEGEND: SYMBOL USED IS CHARACTER D
PLOT OF TIME*TDC LEGEND: SYMBOL USED IS CHARACTER T
PLOT OF TIME*TOC LEGEND: SYMBOL USED IS CHARACTER O



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM   38

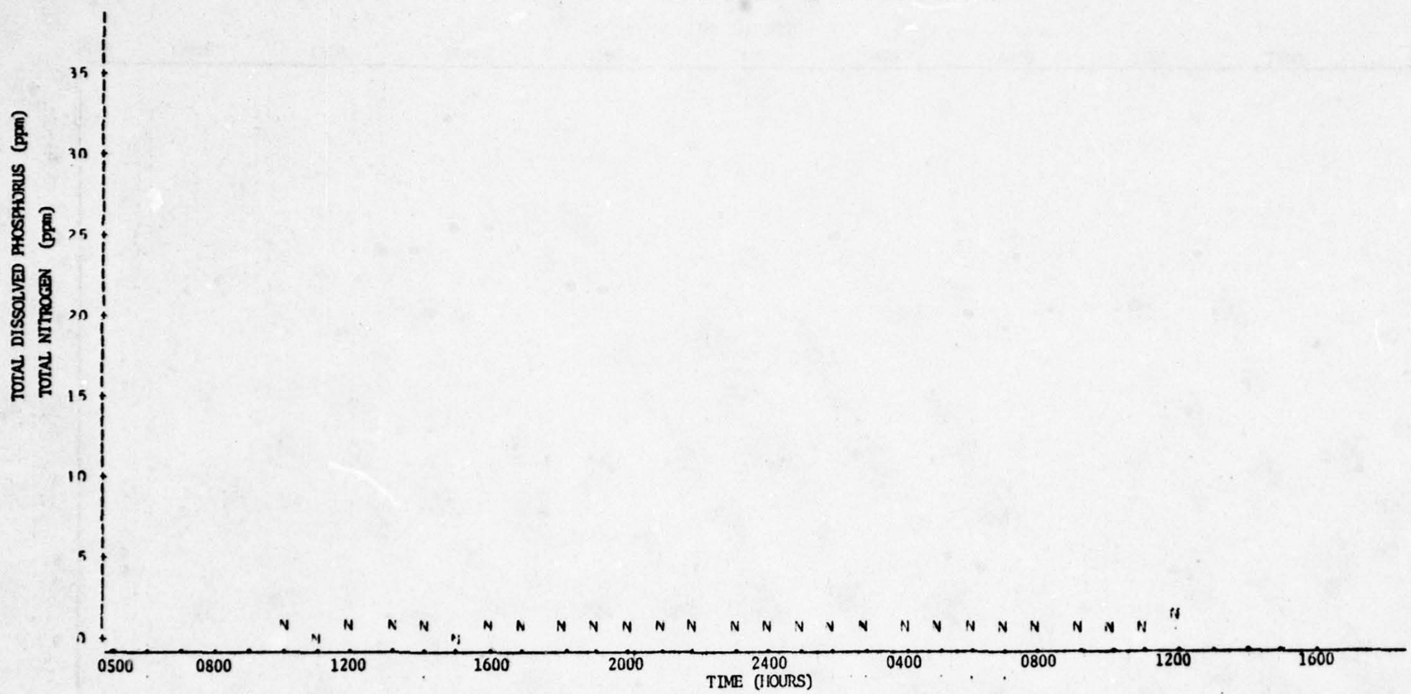
5 - 6 November 1975

PLOT OF TIME*P   LEGEND: SYMBOL USED IS *



5 - 6 November 1975

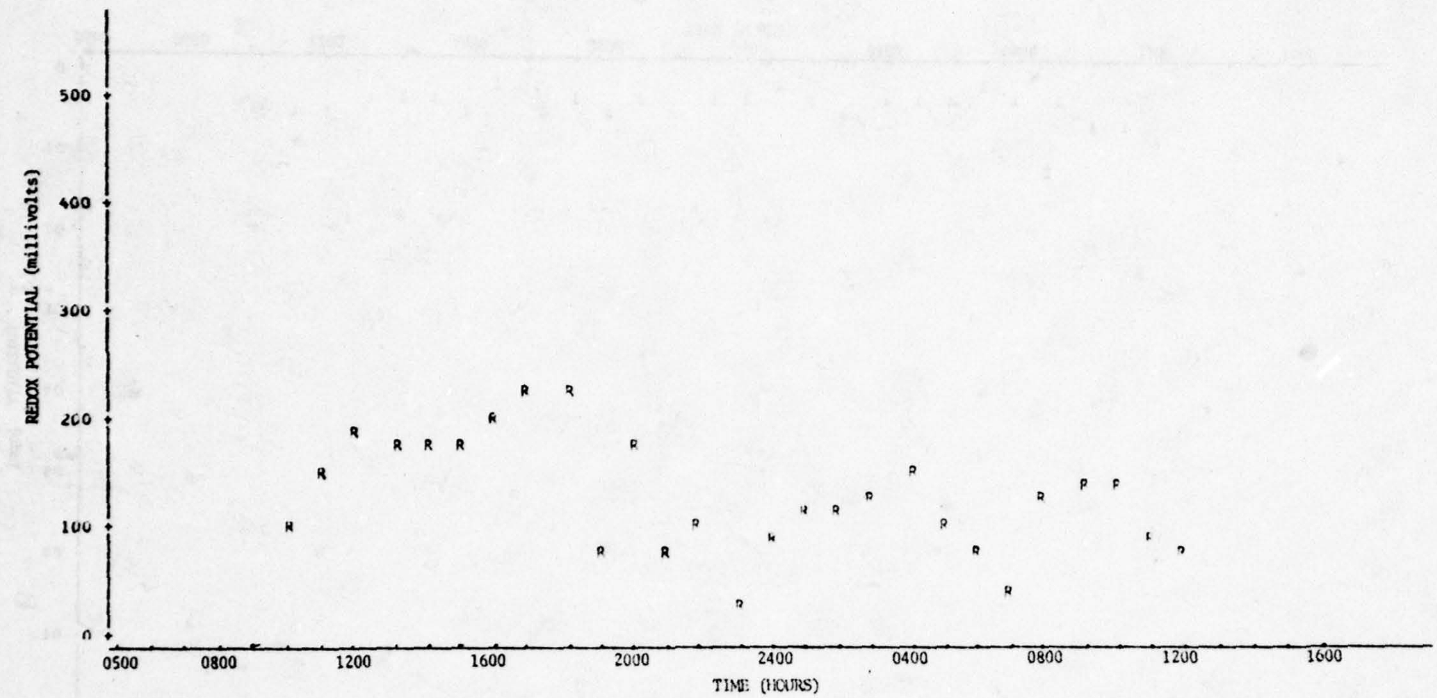
PLOT OF TIME*DPHOS LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*TNIT LEGEND: SYMBOL USED IS CHARACTER N



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

5 - 6 November 1975

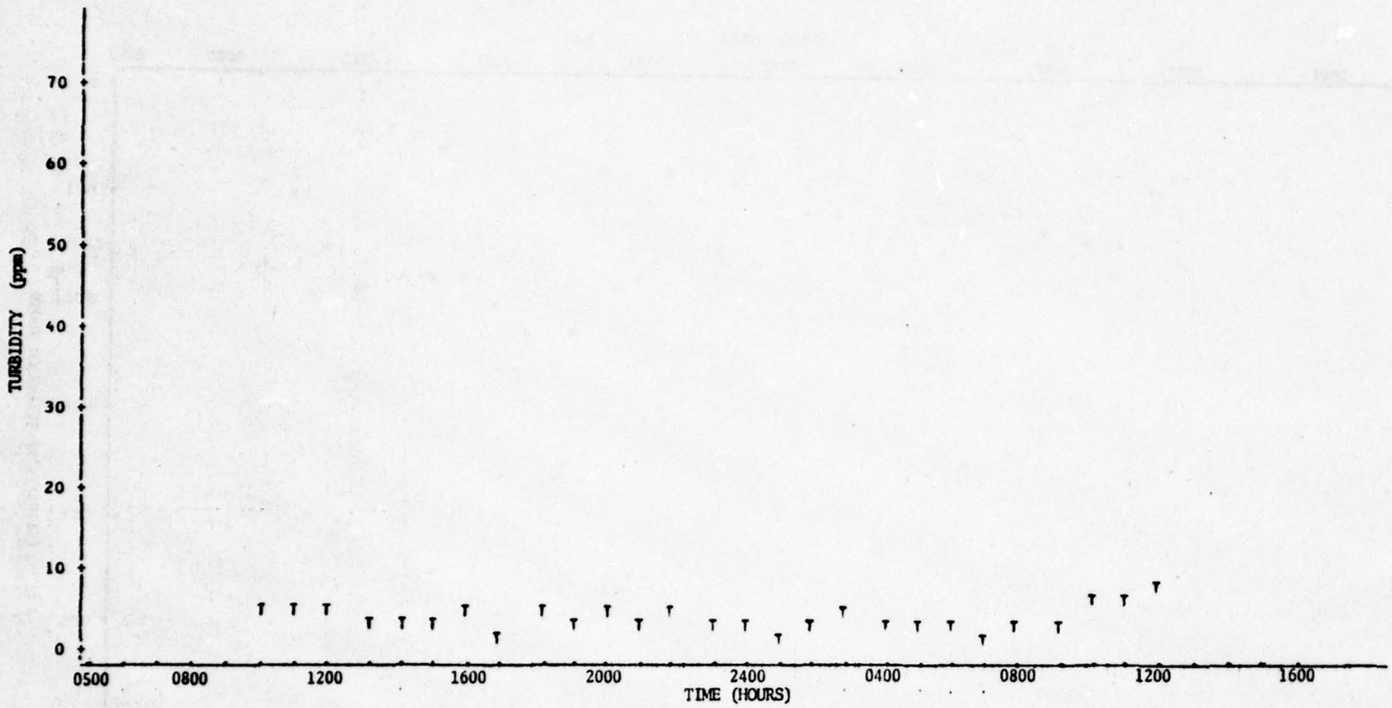
PLOT OF TIME*REDOX LEGEND: SYMBOL USED IS R



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM

5 - 6 November 1975

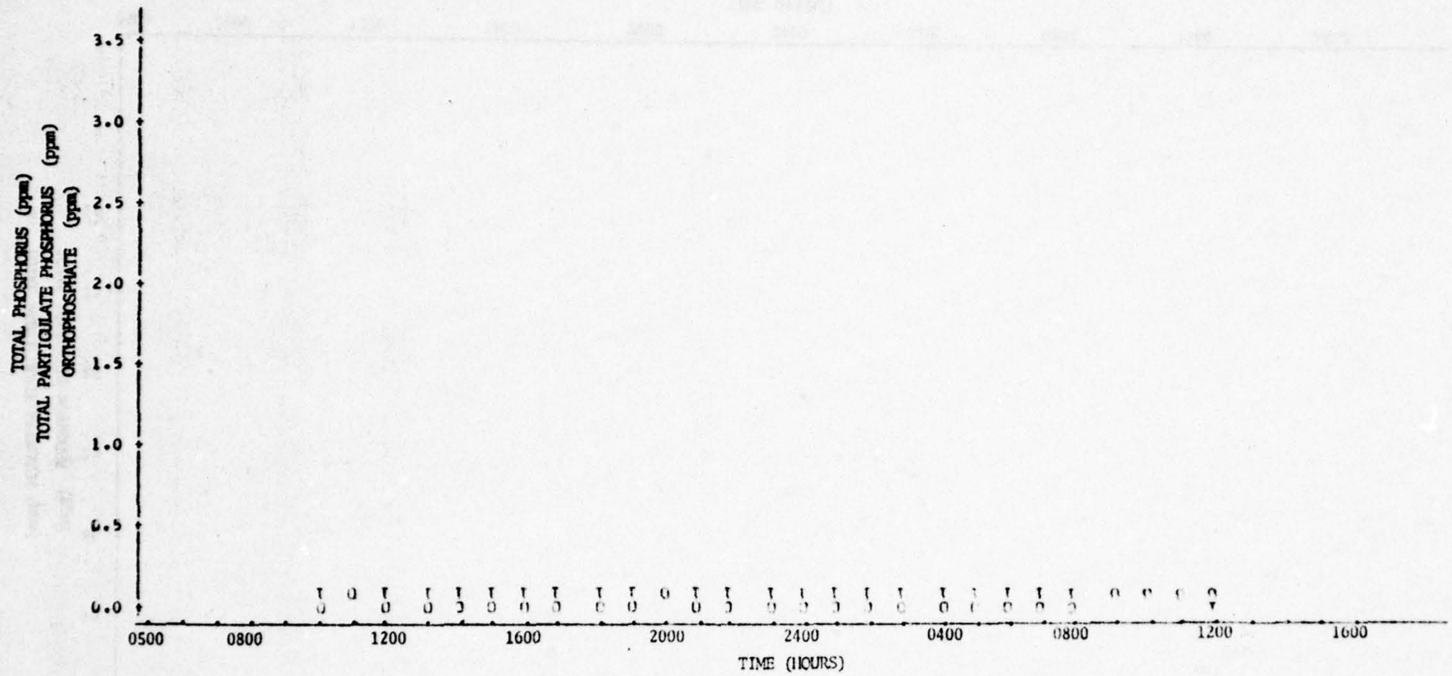
PLOT OF TIME*TURB   LEGEND: SYMBOL USED IS T



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

5 - 6 November 1975

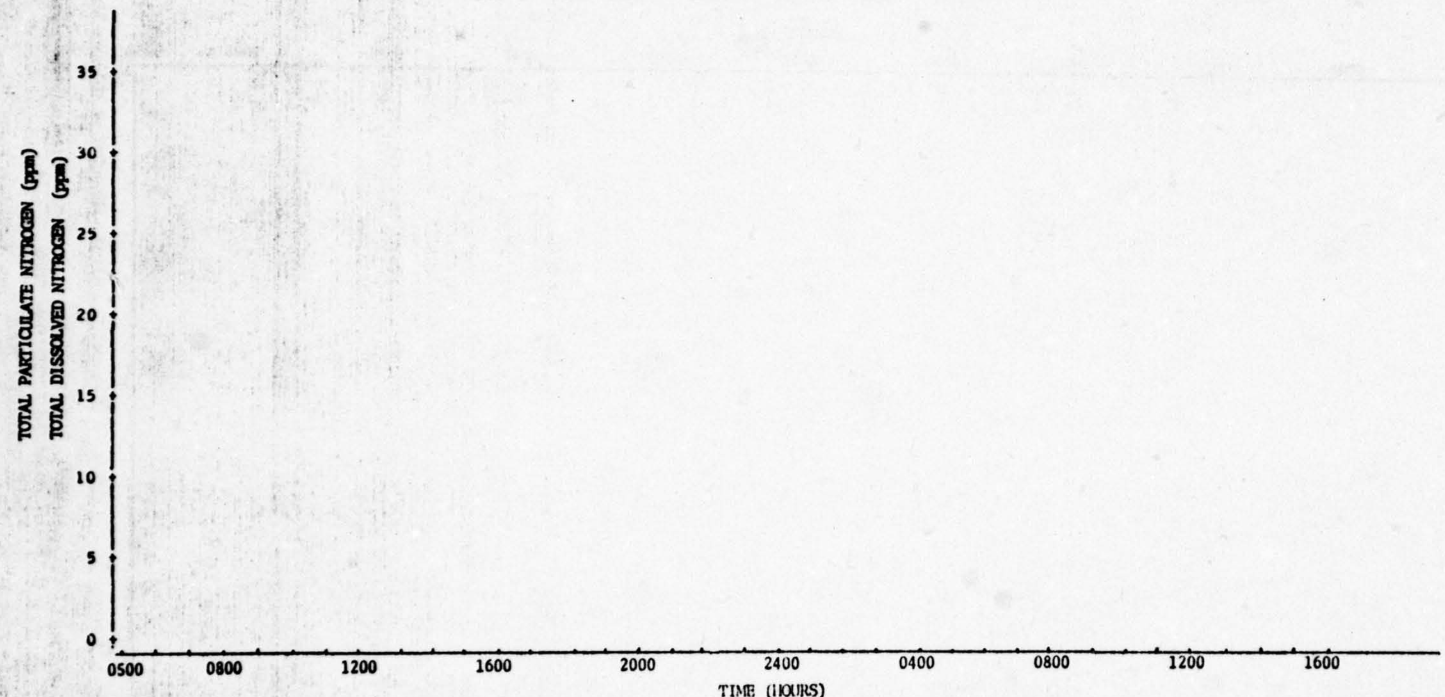
PLOT OF TIME*TPHOS LEGEND: SYMBOL USED IS CHARACTER T
PLOT OF TIME*PPHOS LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*OPHOS LEGEND: SYMBOL USED IS CHARACTER O



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

5 - 6 November 1975

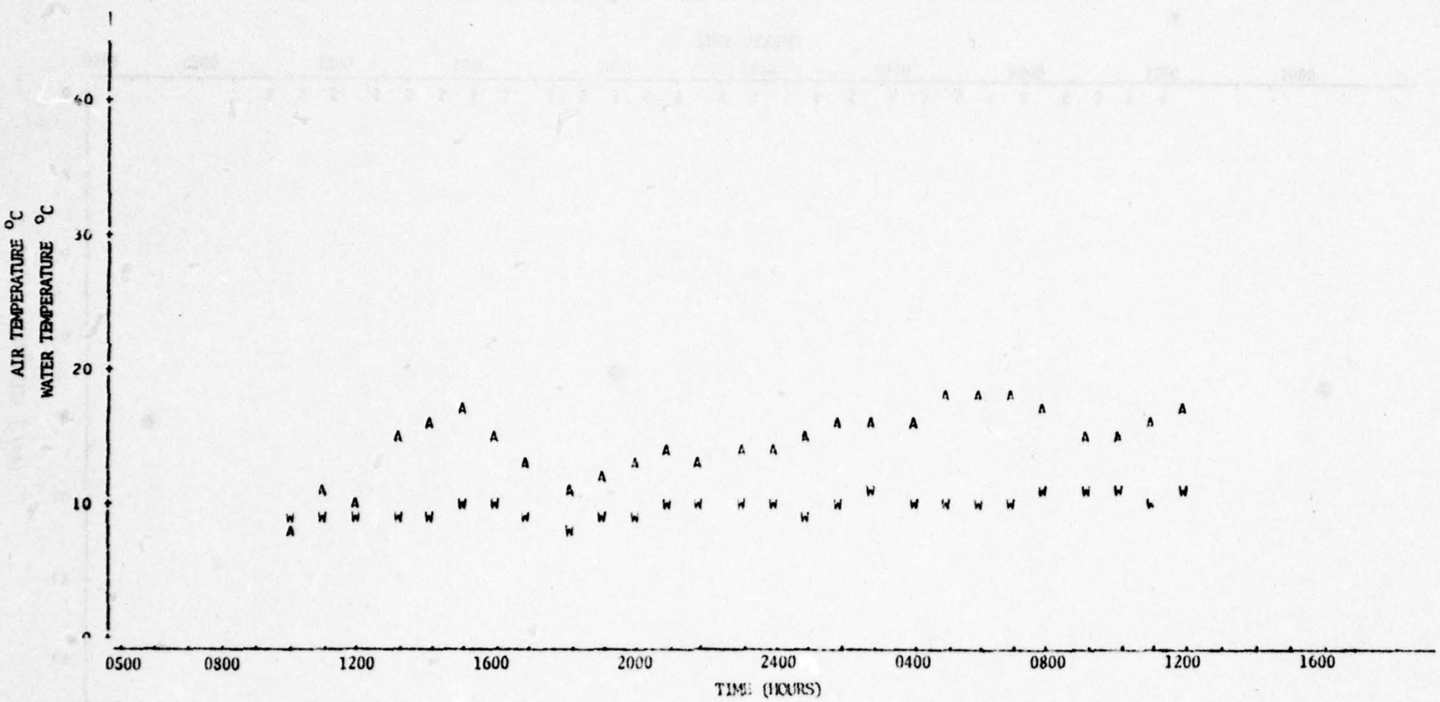
PLOT OF TIME*PNIT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*DNIT LEGEND: SYMBOL USED IS CHARACTER D



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM 9

7 - 8 January 1976

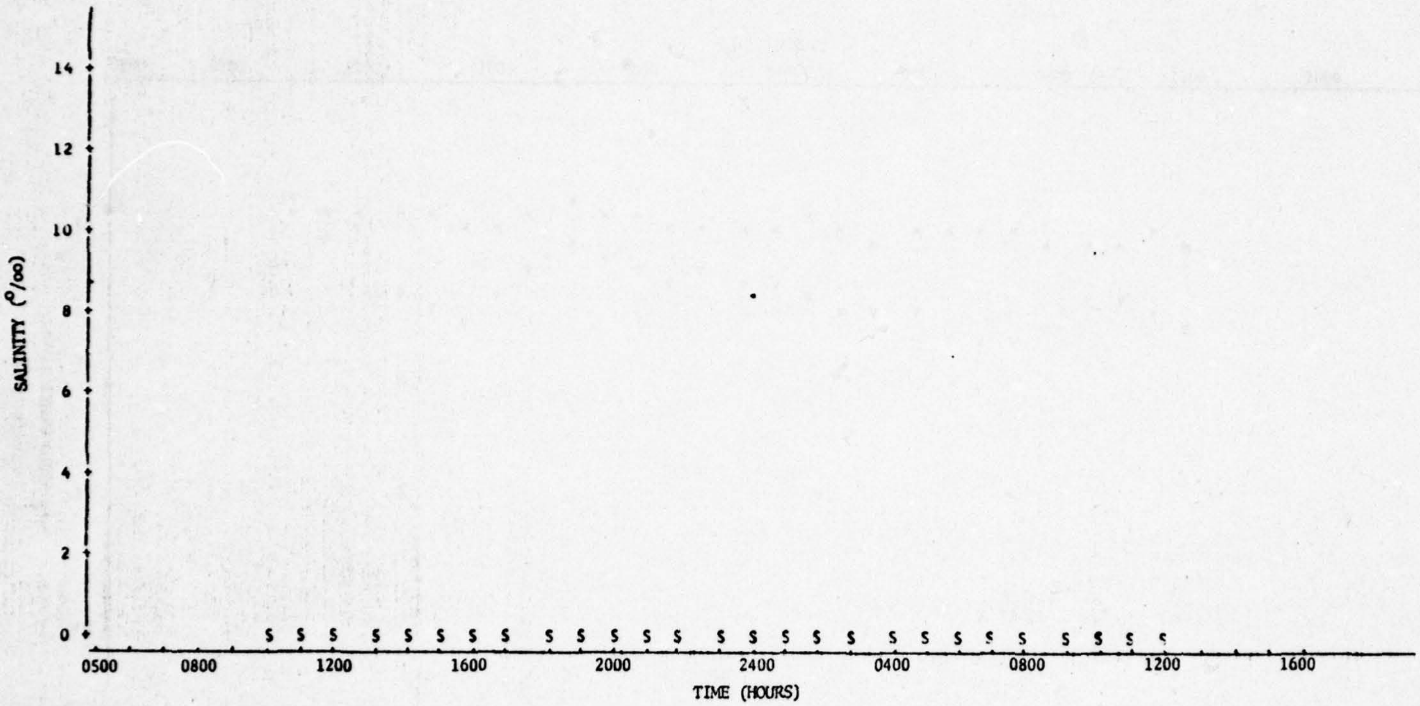
PLOT OF TIME*AIR_T LEGEND: SYMBOL USED IS CHARACTER A
PLOT OF TIME*WAT_T LEGEND: SYMBOL USED IS CHARACTER W



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

7 - 8 January 1976

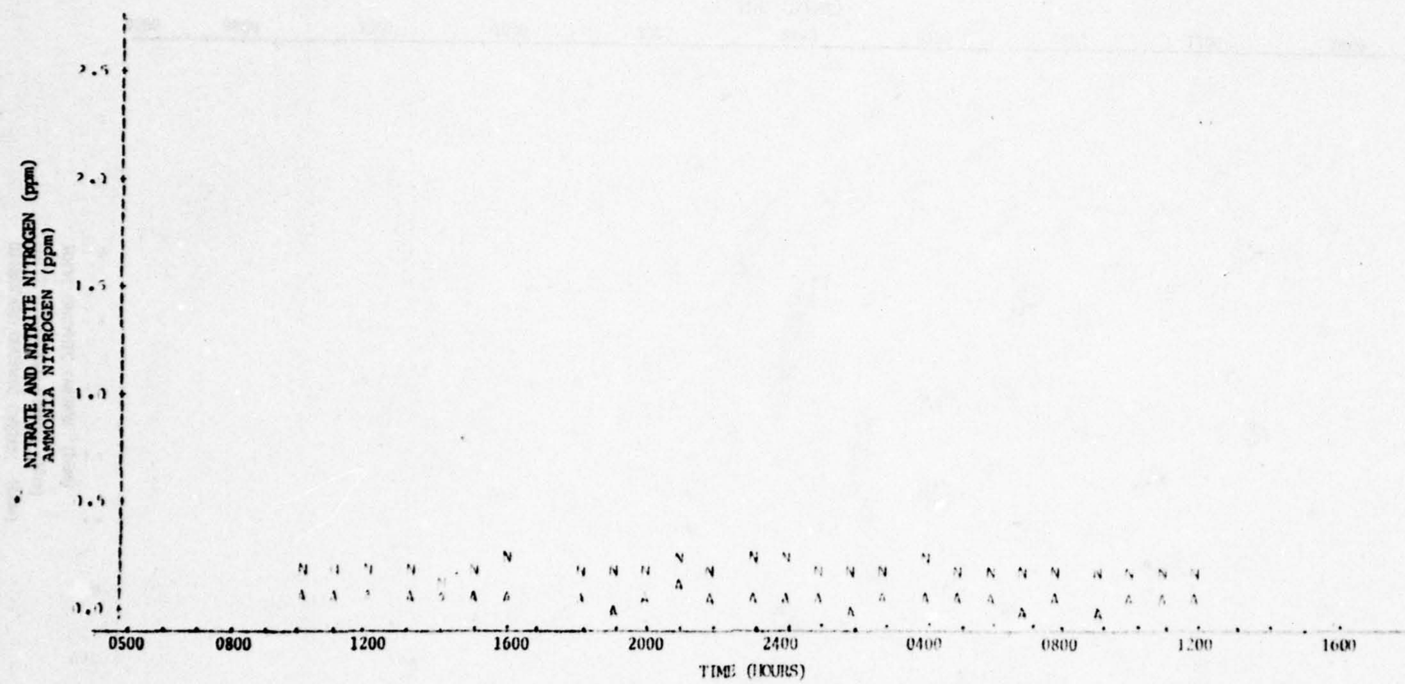
PLOT OF TIME*SAL LEGEND: SYMBOL USED IS S



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM   11

7 - 8 January 1976

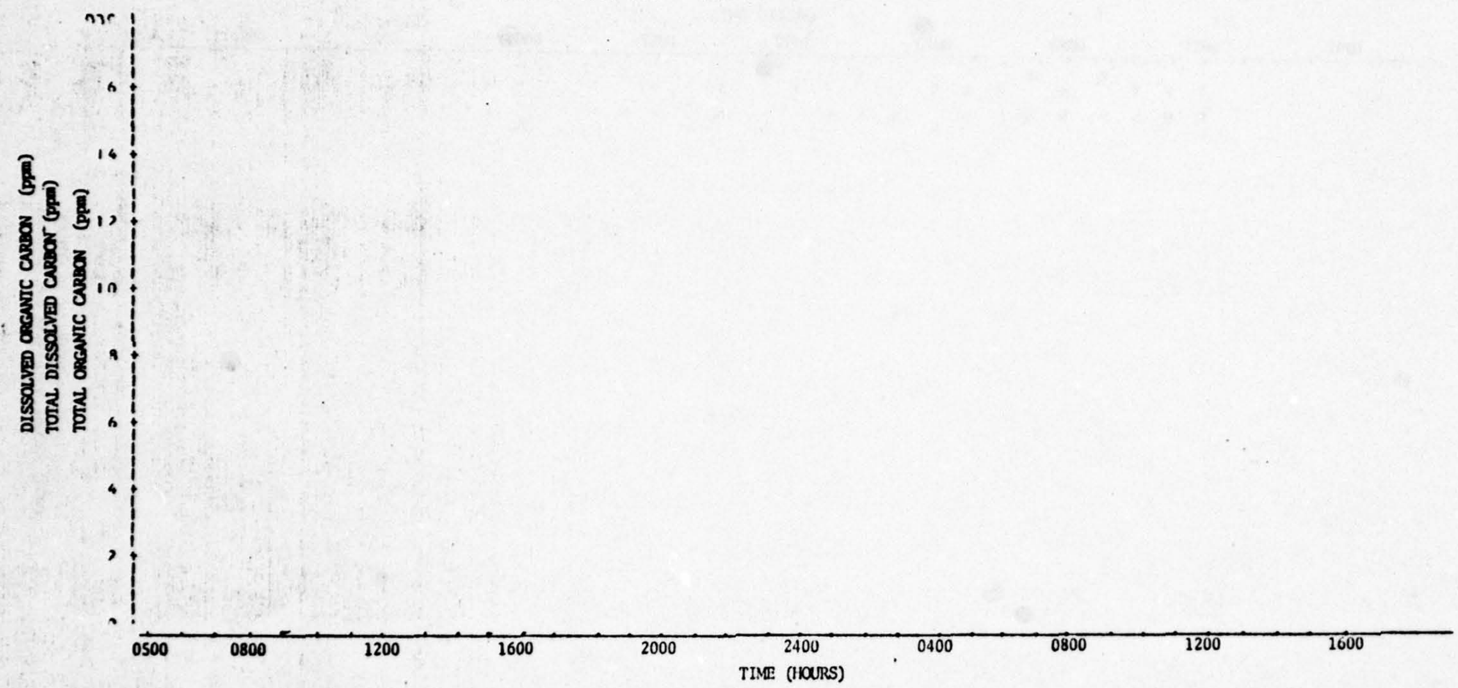
PLOT OF TIME*NITA   LEGEND: SYMBOL USED IS CHARACTER N
PLOT OF TIME*AMMO   LEGEND: SYMBOL USED IS CHARACTER A



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM   ..12

7 - 8 January 1976

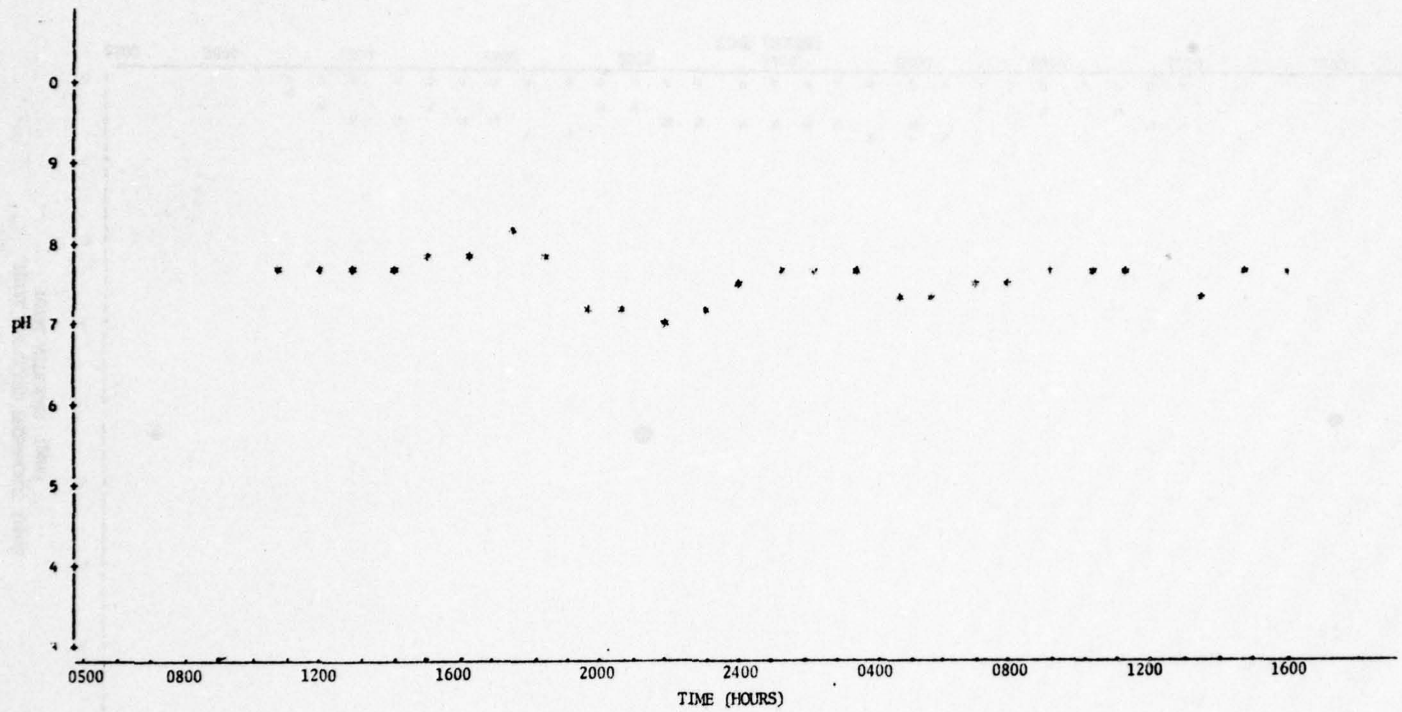
PLOT OF TIME*DOC   LEGEND: SYMBOL USED IS CHARACTER D
PLOT OF TIME*TDC   LEGEND: SYMBOL USED IS CHARACTER T
PLOT OF TIME*TOC   LEGEND: SYMBOL USED IS CHARACTER O



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

7 - 8 January 1976

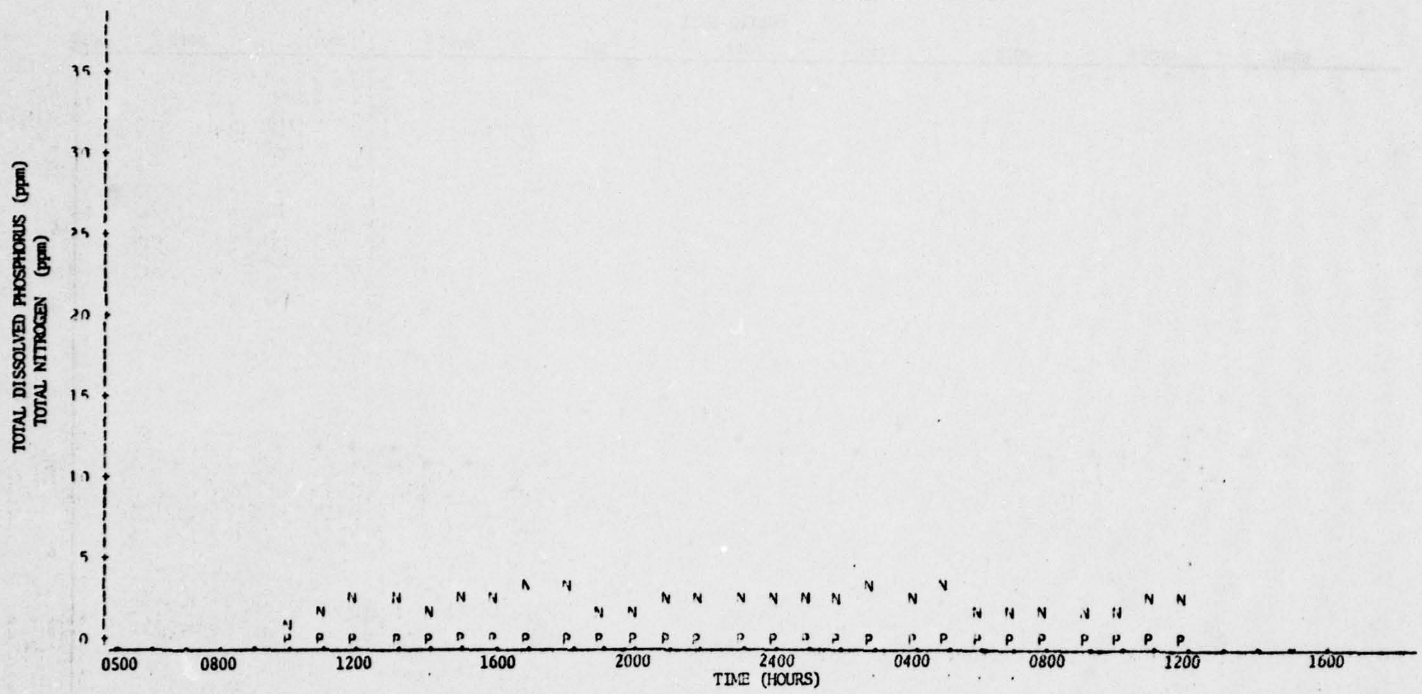
PLOT OF TIME*P LEGEND: SYMBOL USED IS *



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

7 - 8 January 1976

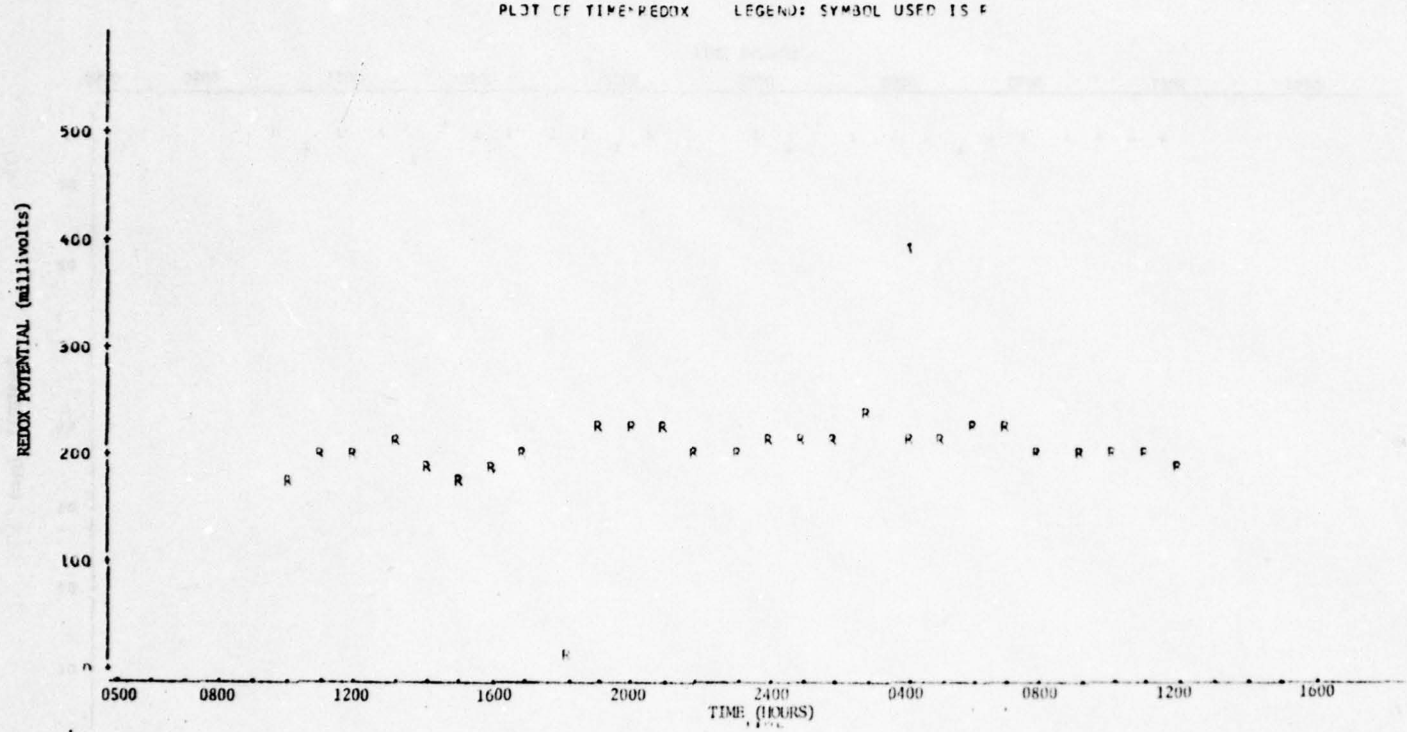
PLOT OF TIME*PHOS LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*TNIT LEGEND: SYMBOL USED IS CHARACTER N



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM 56

7 - 8 January 1976

PLOT OF TIME*REDOX LEGEND: SYMBOL USED IS R

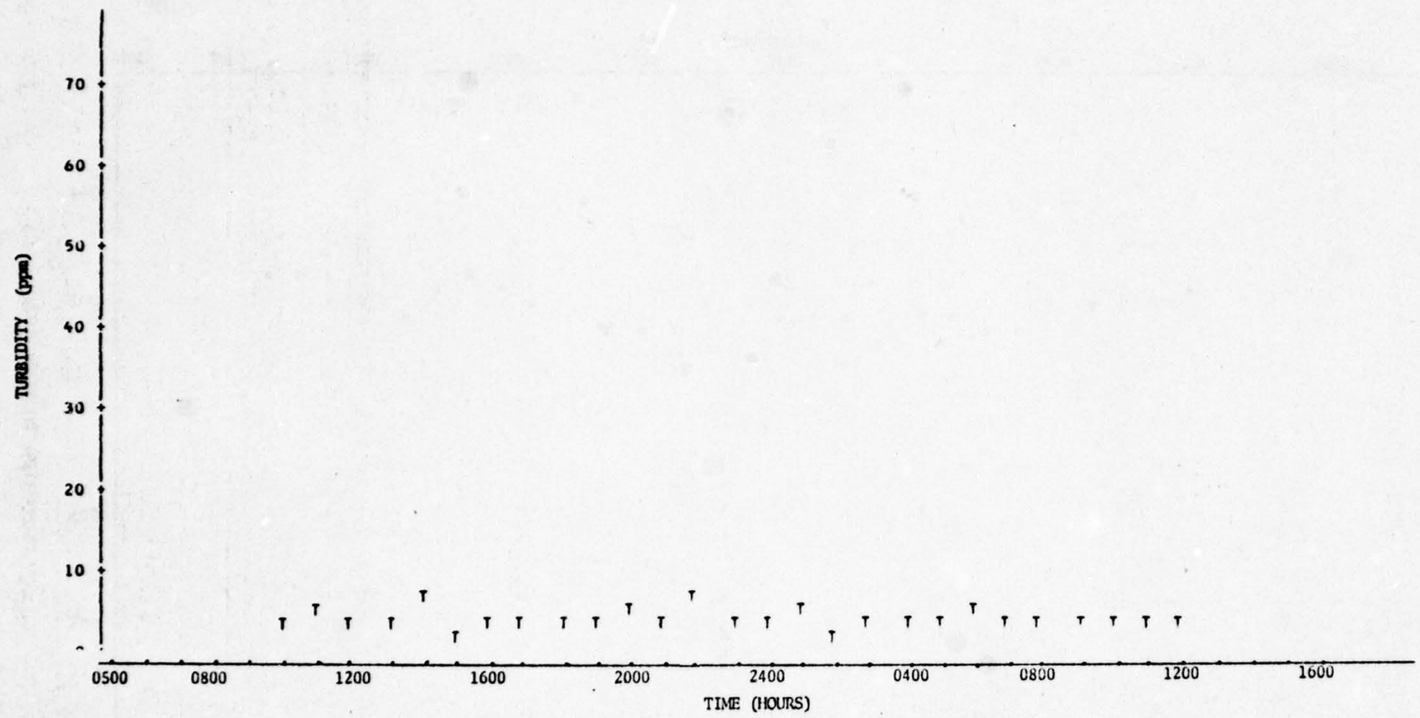


A97

PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM   73

7 - 8 January 1976

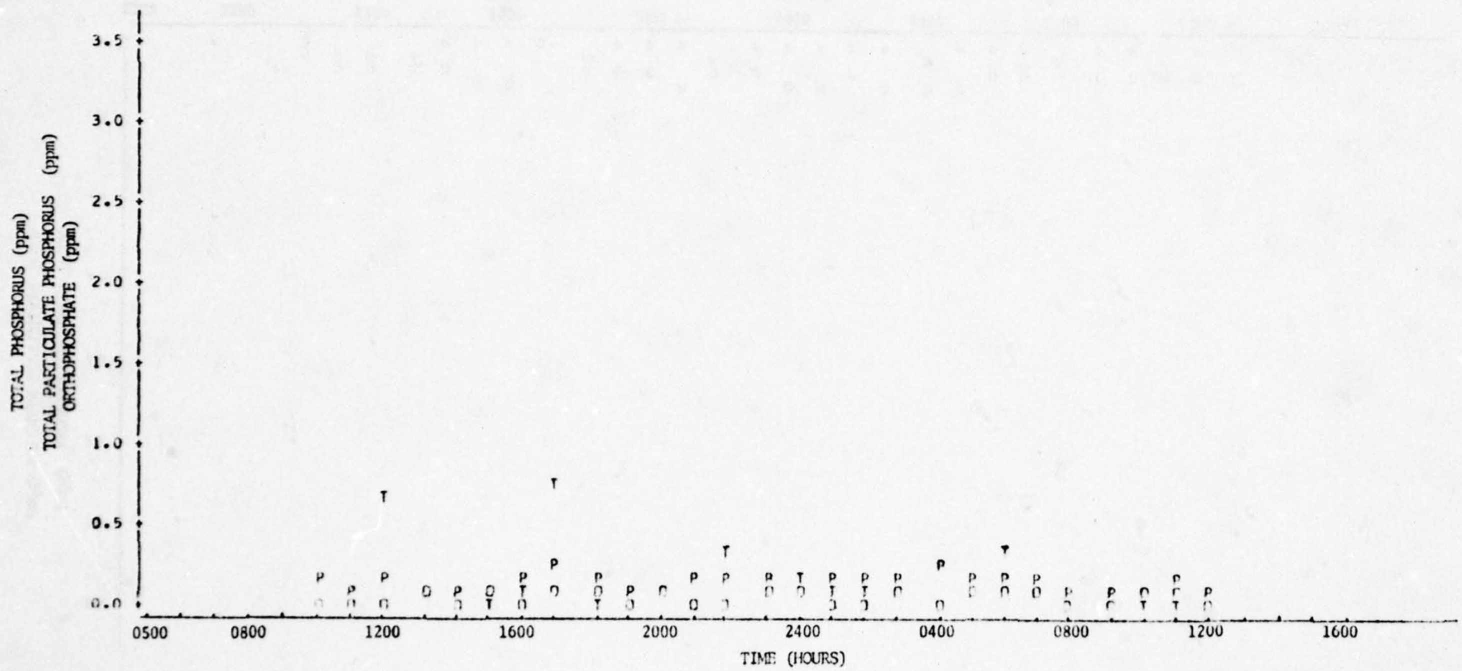
PLOT OF TIME*TURB   LEGEND: SYMBOL USED IS T



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM   30

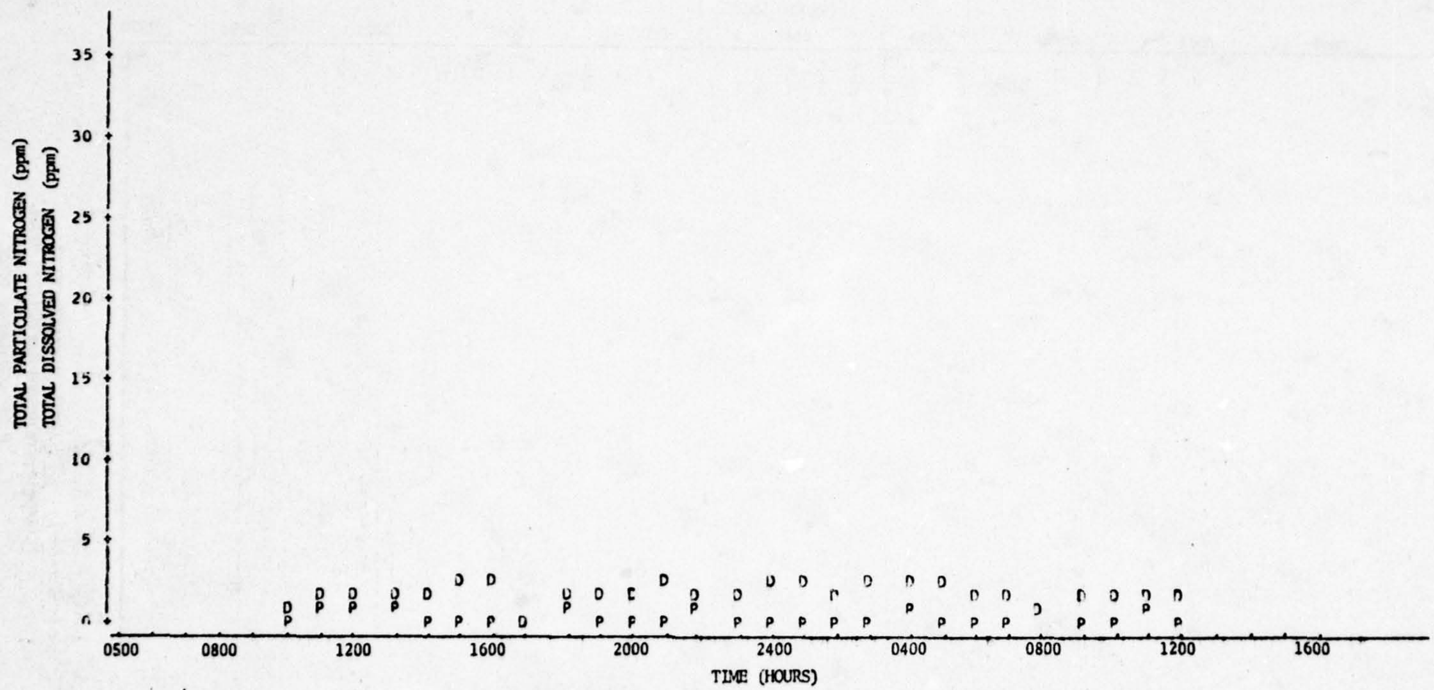
7 - 8 January 1976

PLOT OF TIME*TPHOS   LEGEND: SYMBOL USED IS CHARACTER T
PLOT OF TIME*PPHOS   LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*OPHOS   LEGEND: SYMBOL USED IS CHARACTER O



7 - 8 January 1976

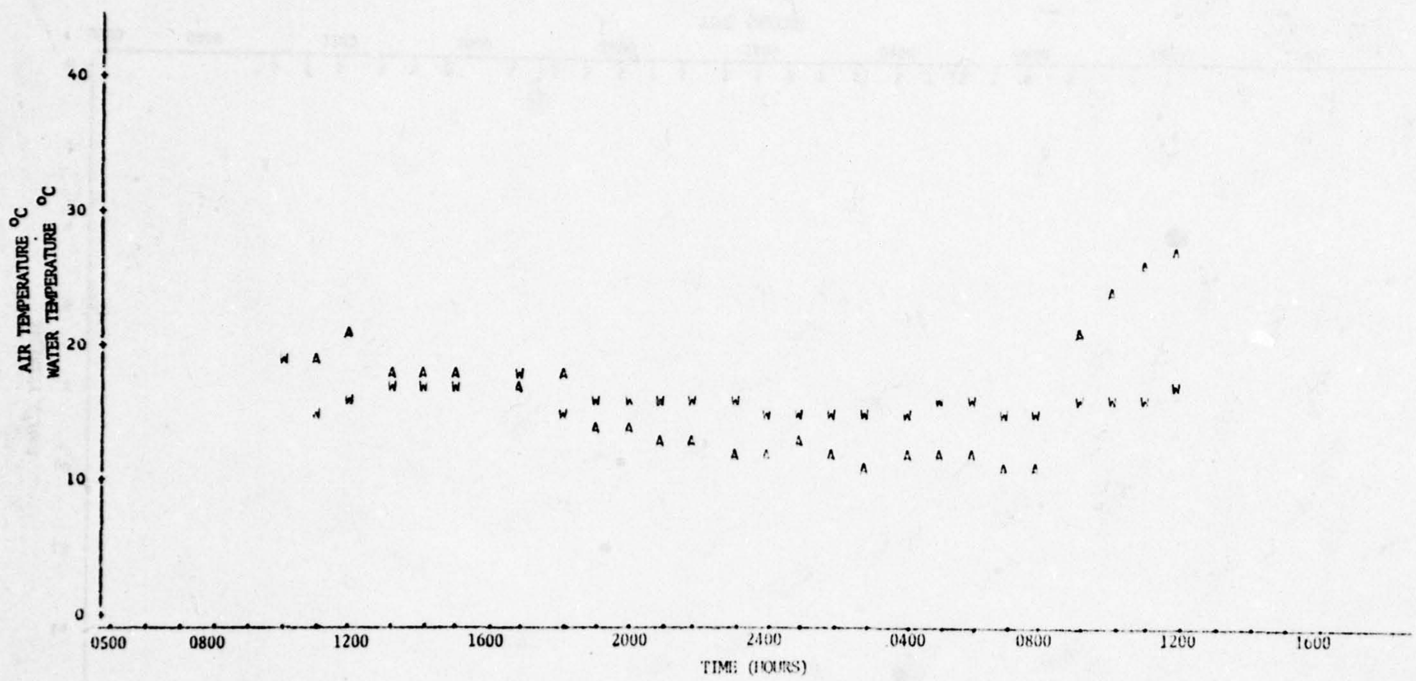
PLOT OF TIME*PNIT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*DNIT LEGEND: SYMBOL USED IS CHARACTER D



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

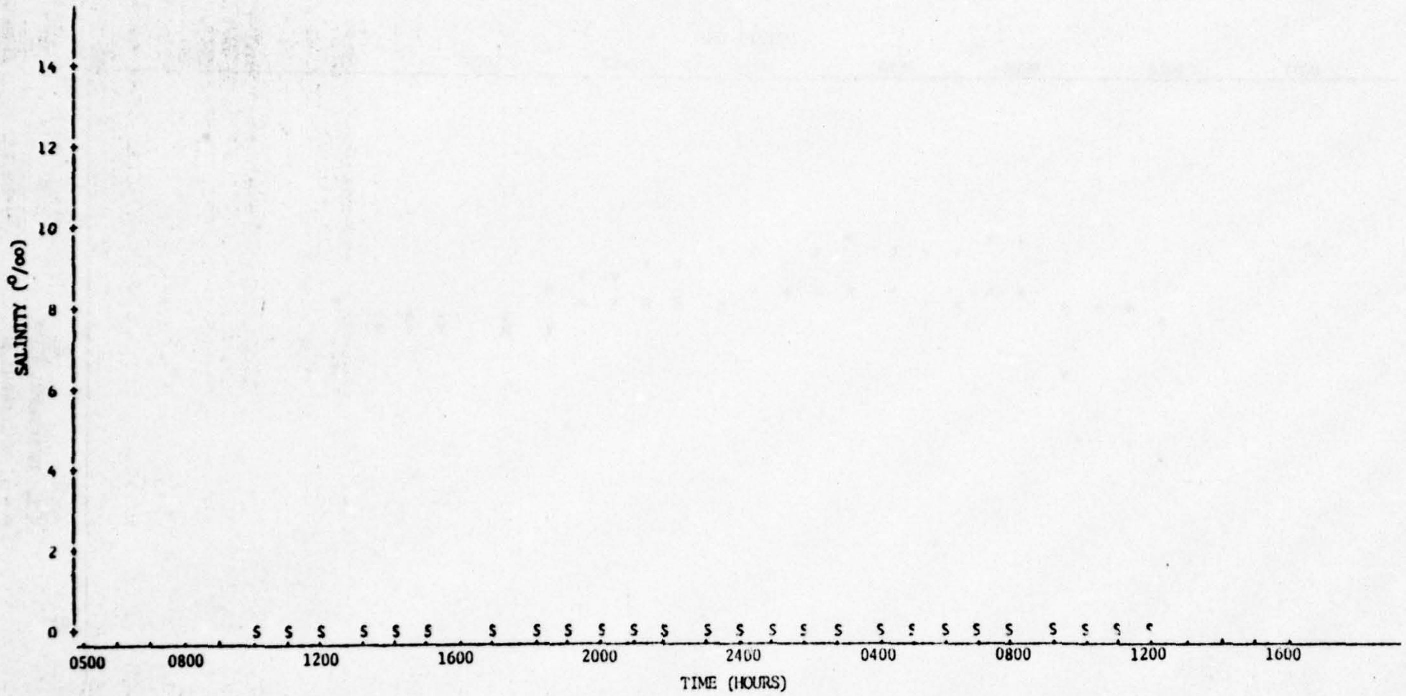
25 - 26 February 1976

PLOT OF TIME*AIR_T LEGEND: SYMBOL USED IS CHARACTER A
PLOT OF TIME*WAT_T LEGEND: SYMBOL USED IS CHARACTER W



25 - 26 February 1976

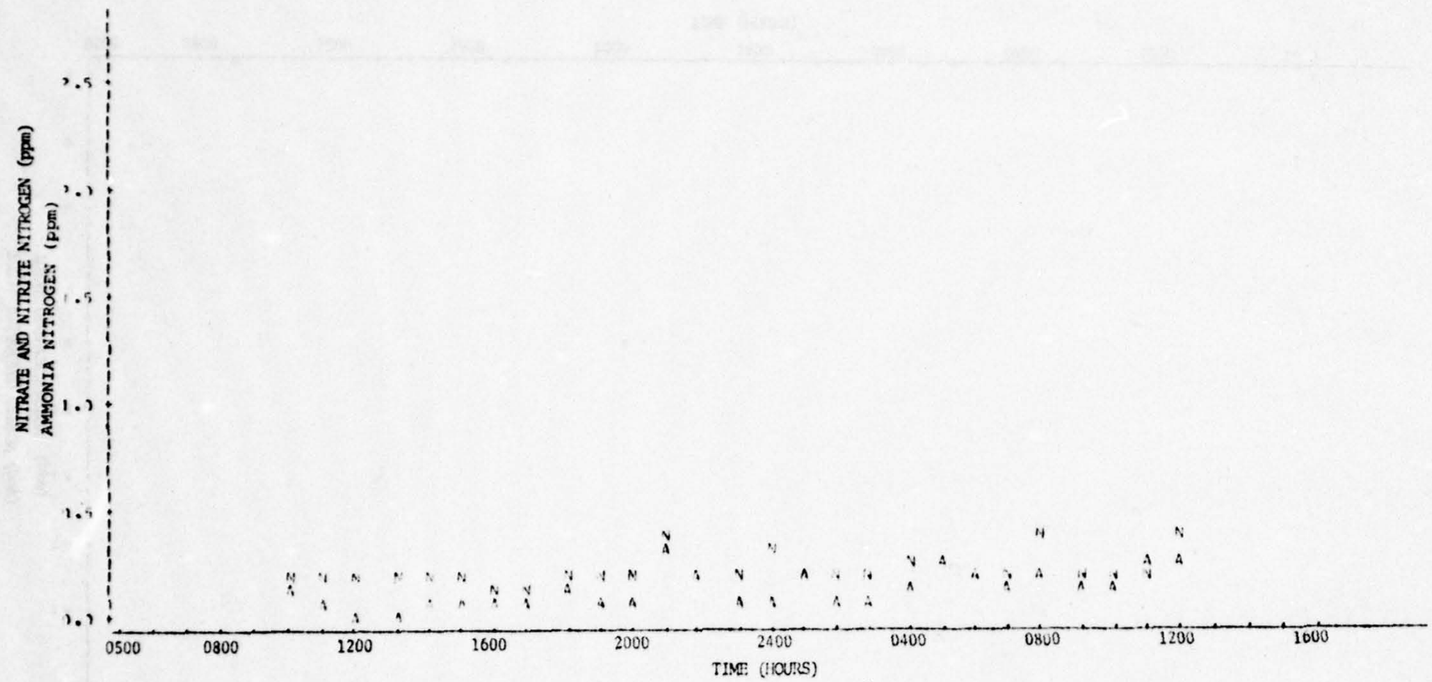
PLOT OF TIME*SAL   LEGEND: SYMBOL USED IS S



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFOR4   13

25 - 26 February 1976

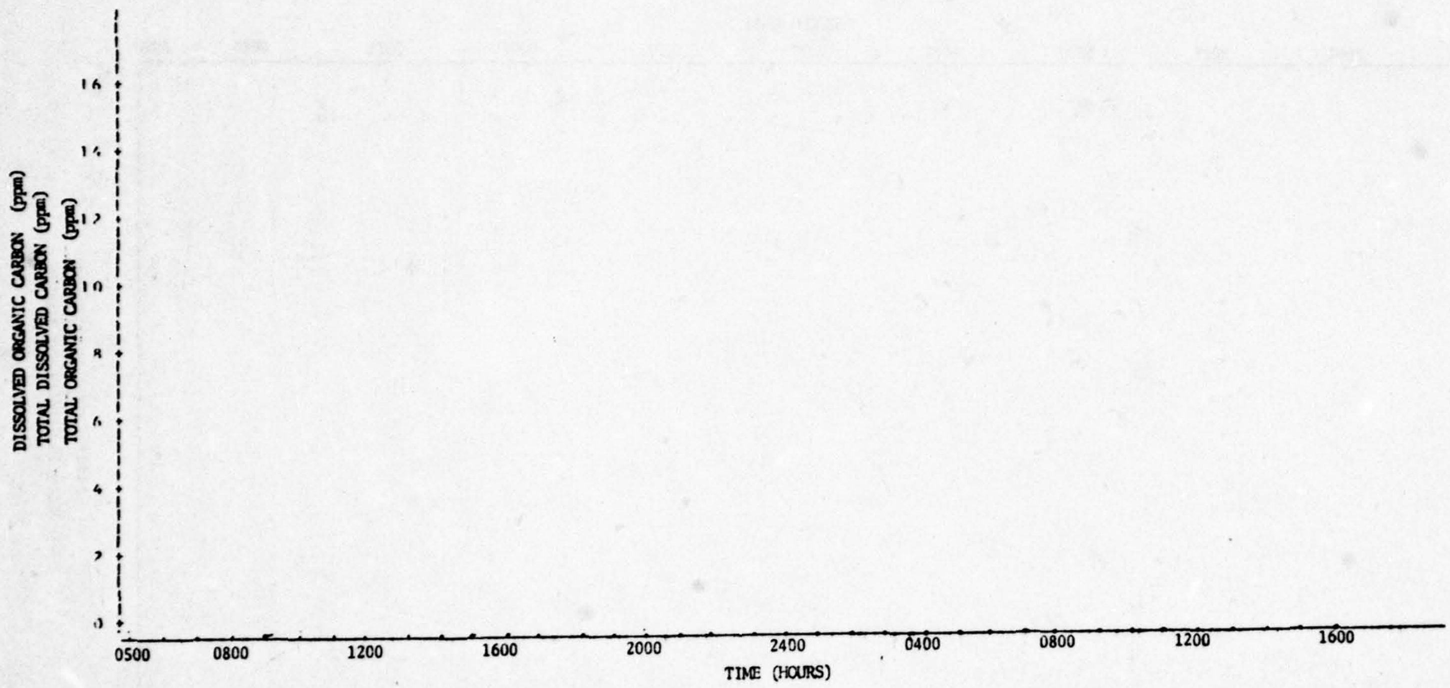
PLOT OF TIME*NITA   LEGEND: SYMBOL USED IS CHARACTER N
PLOT OF TIME*AMMO   LEGEND: SYMBOL USED IS CHARACTER A



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

25 - 26 February 1976

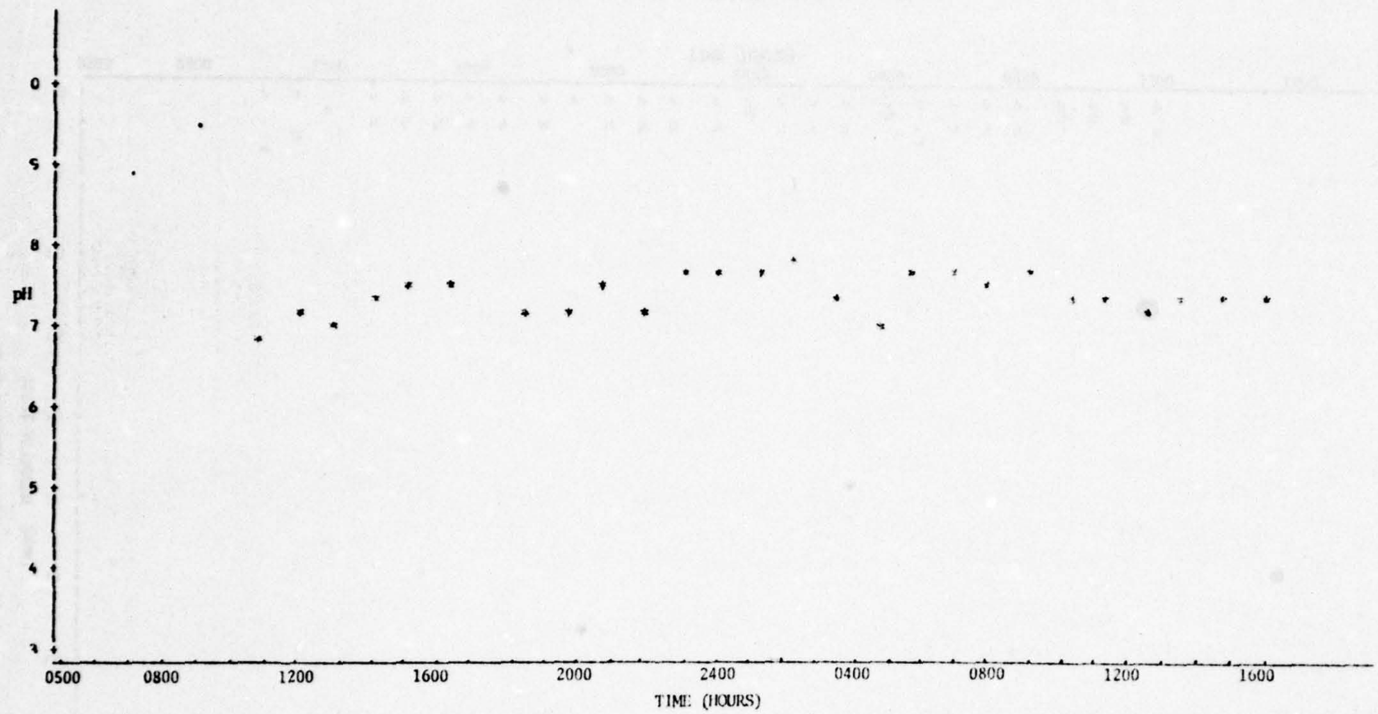
PLOT OF TIME*DOC LEGEND: SYMBOL USED IS CHARACTER D
PLOT OF TIME*TDC LEGEND: SYMBOL USED IS CHARACTER T
PLOT OF TIME*TOC LEGEND: SYMBOL USED IS CHARACTER O



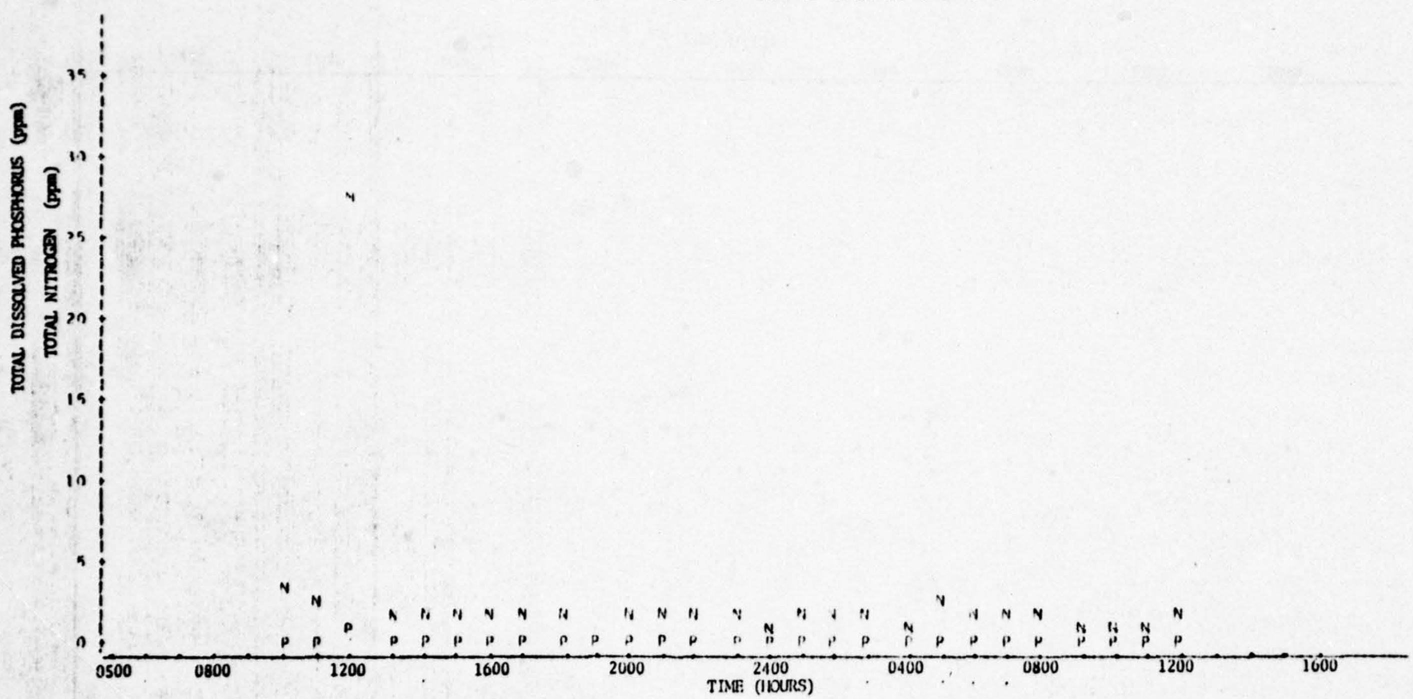
PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM   40

25 - 26 February 1976

PLOT OF TIME*P   LEGEND: SYMBOL USED IS *



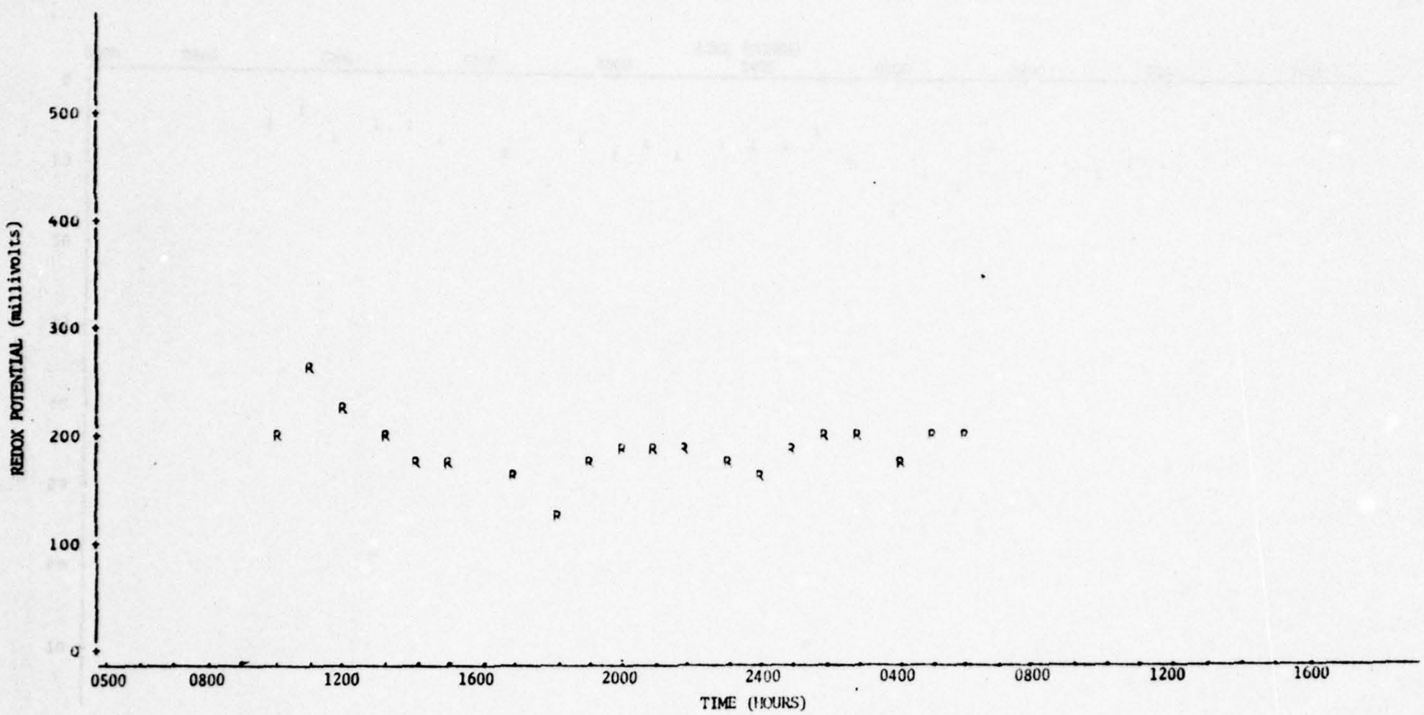
25 - 26 February 1976



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

25 - 26 February 1976

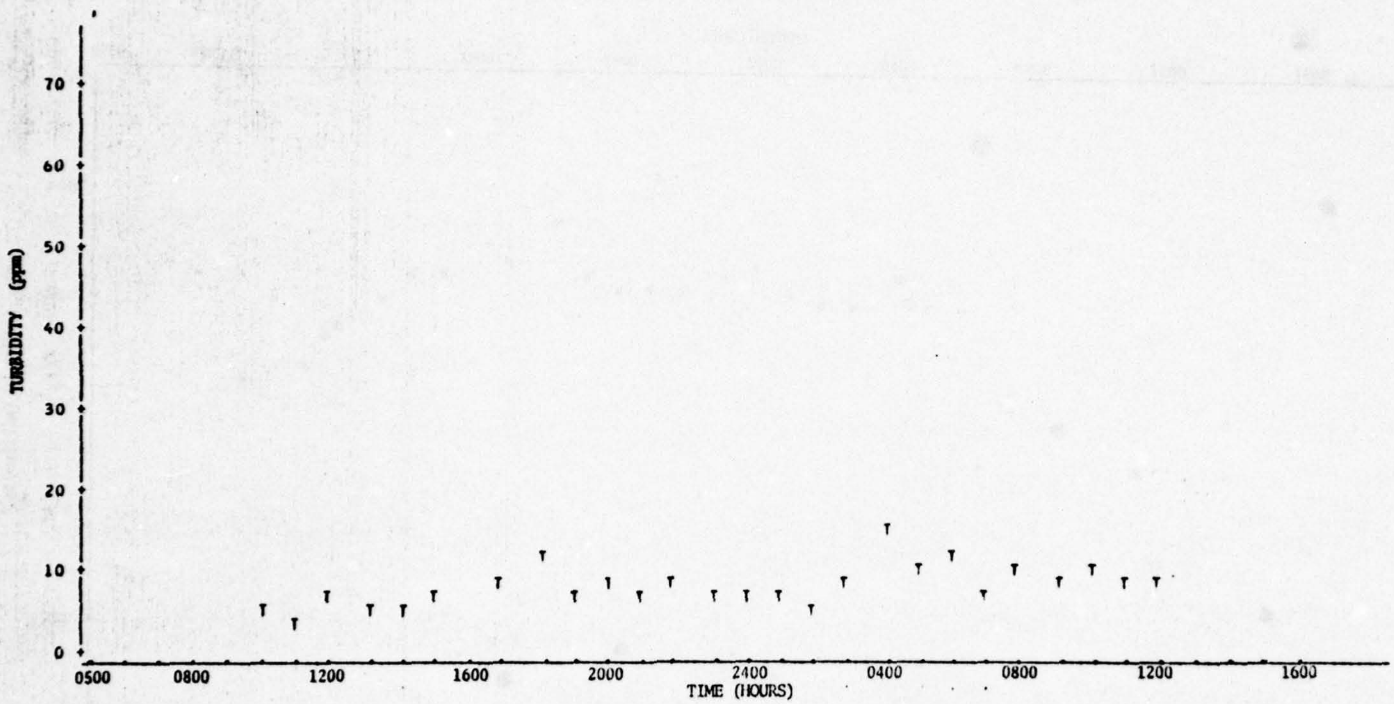
PLOT OF TIME*REDOX LEGEND: SYMBOL USED IS R



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

25 - 26 February 1976

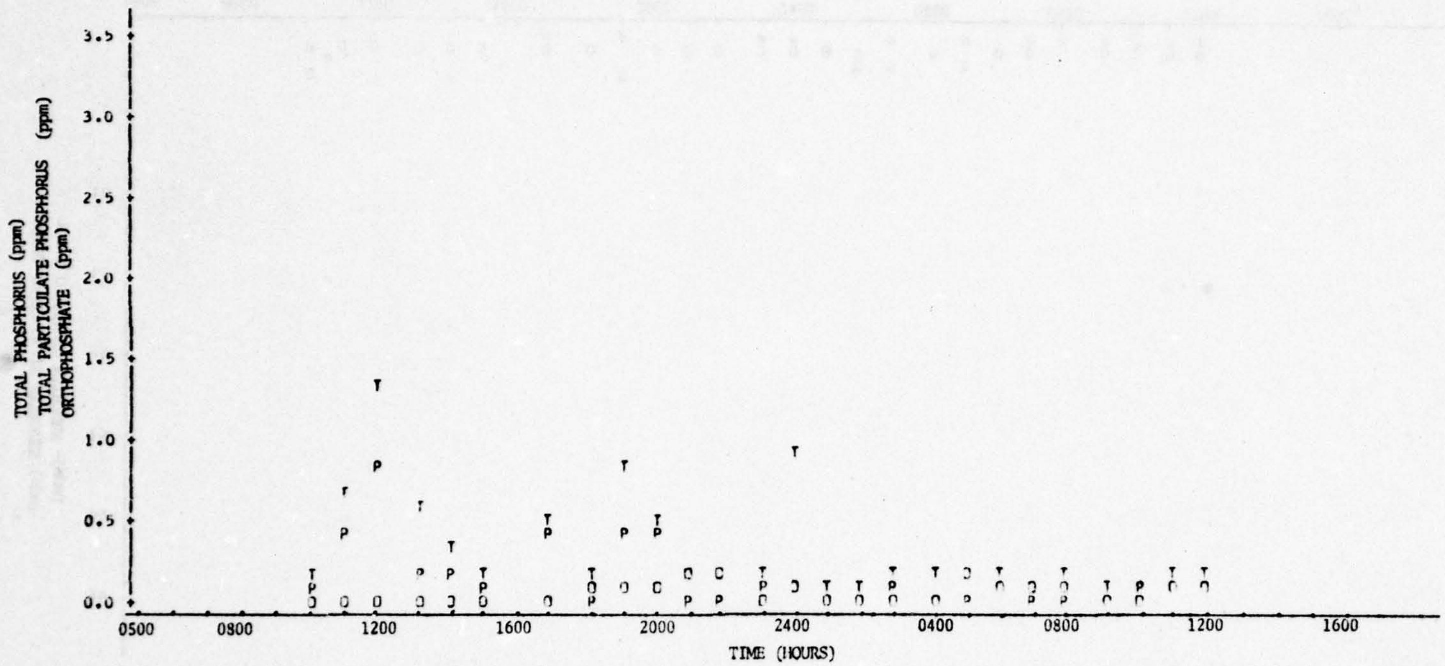
PLOT OF TIME*TURB LEGEND: SYMBOL USED IS T



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

25 - 26 February 1976

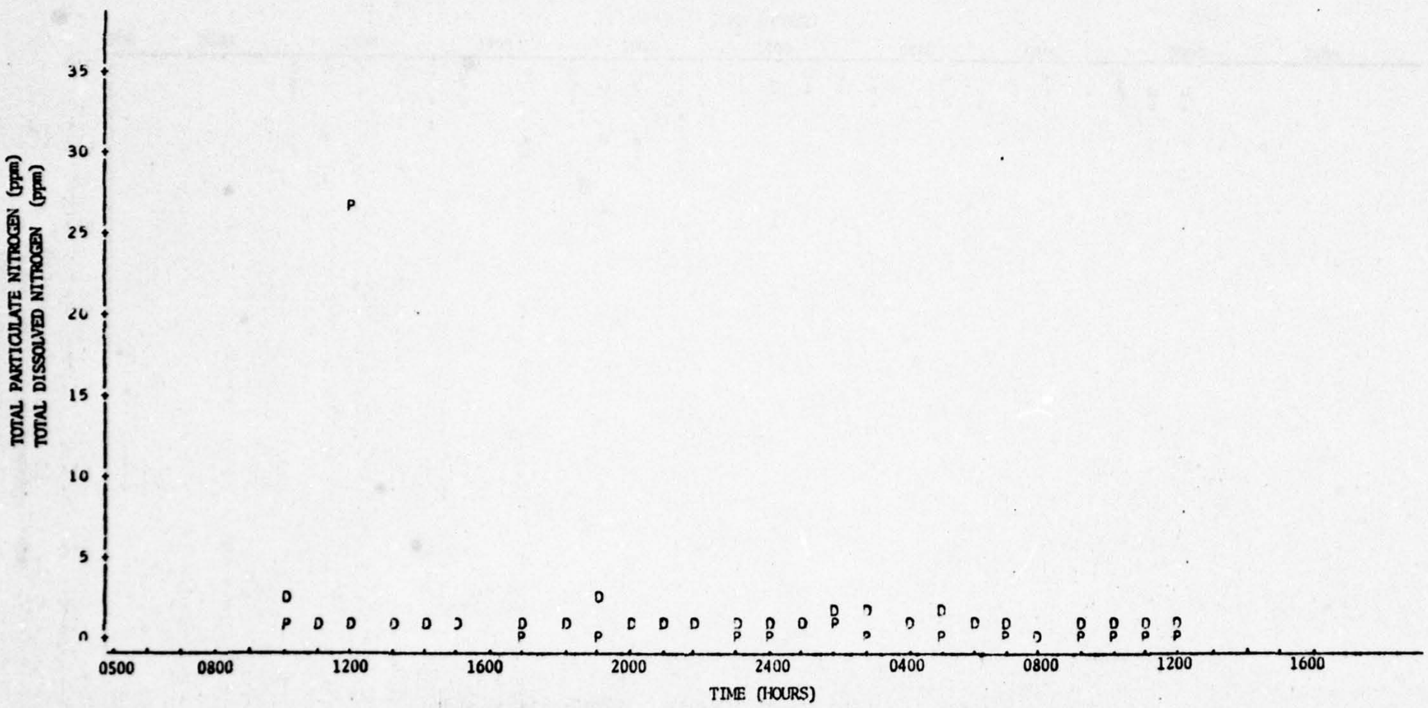
PLOT OF TIME*TPHOS LEGEND: SYMBOL USED IS CHARACTER T
PLOT OF TIME*PPHOS LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*OPHOS LEGEND: SYMBOL USED IS CHARACTER O



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

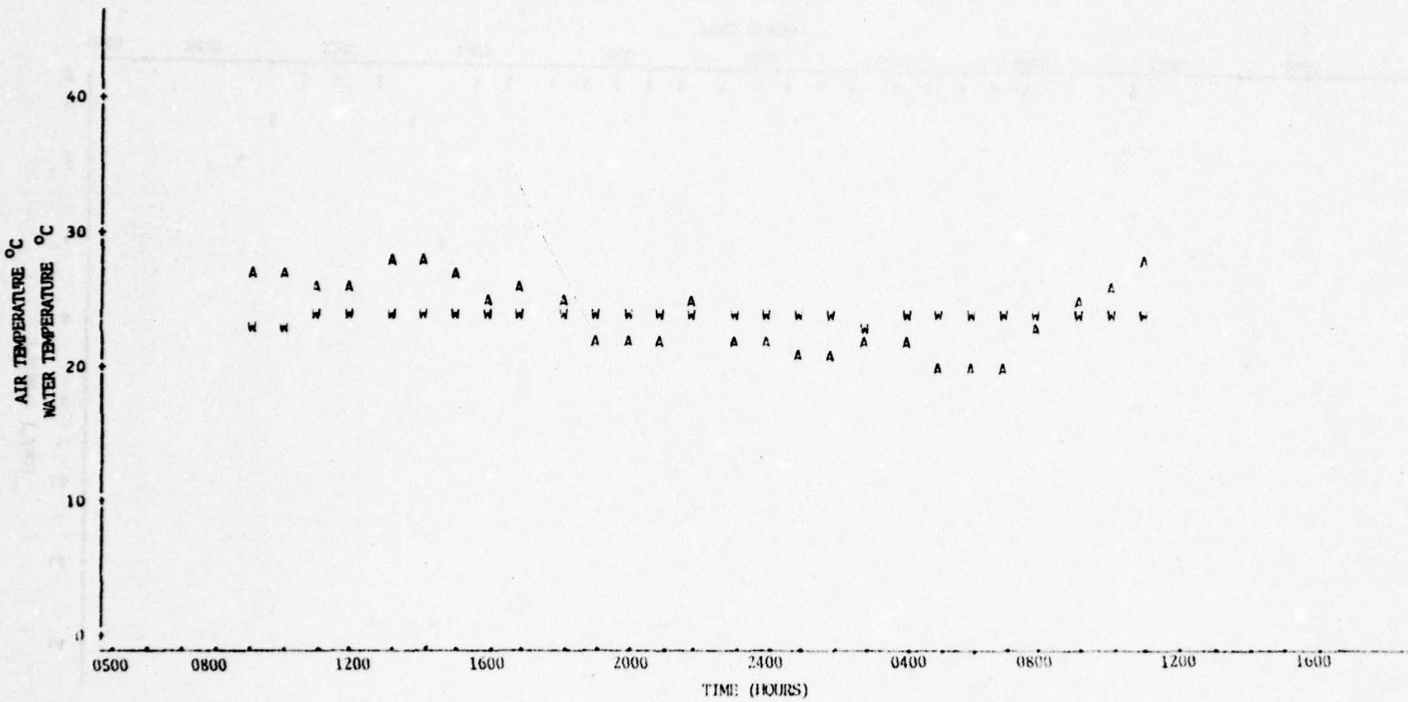
25 - 26 February 1976

PLOT OF TIME*PNIT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*DNIT LEGEND: SYMBOL USED IS CHARACTER D



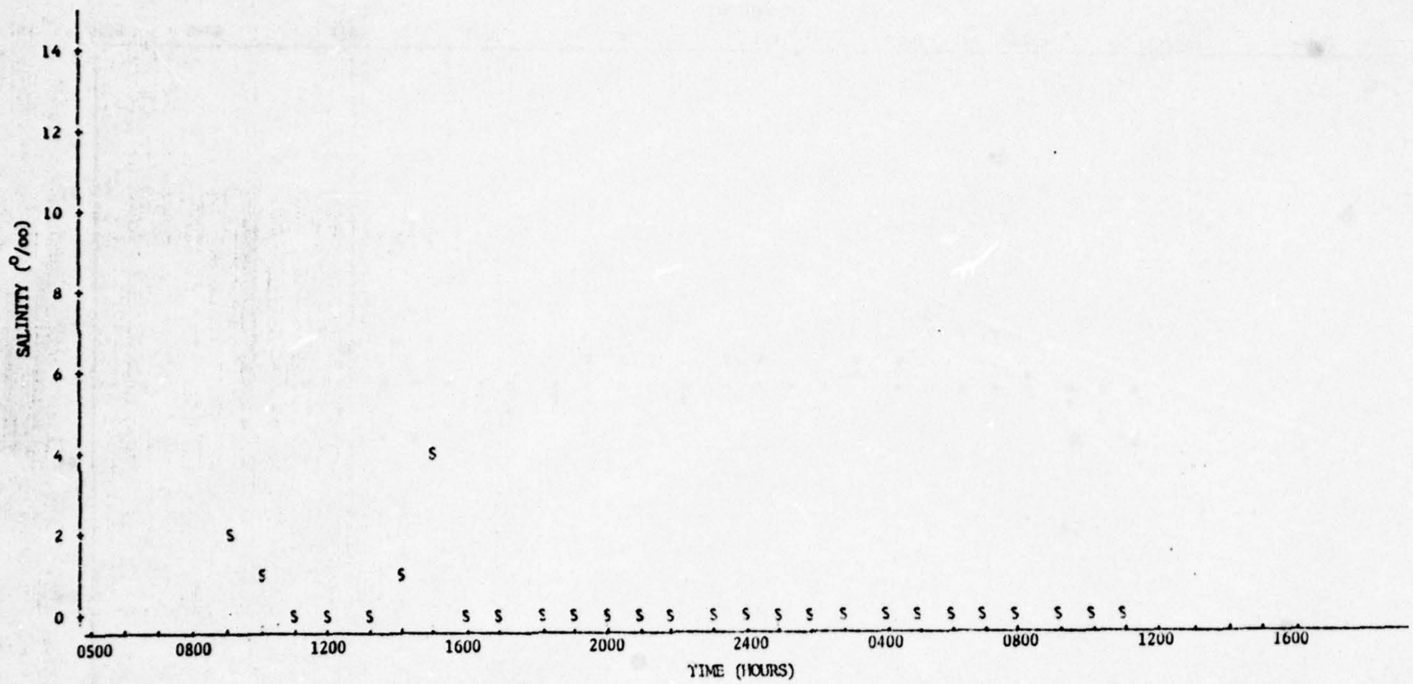
21 - 22 April 1976

PLOT OF TIME*AIR_T   LEGEND: SYMBOL USED IS CHARACTER A
PLOT OF TIME*WAT_T   LEGEND: SYMBOL USED IS CHARACTER W



21 - 22 April 1976

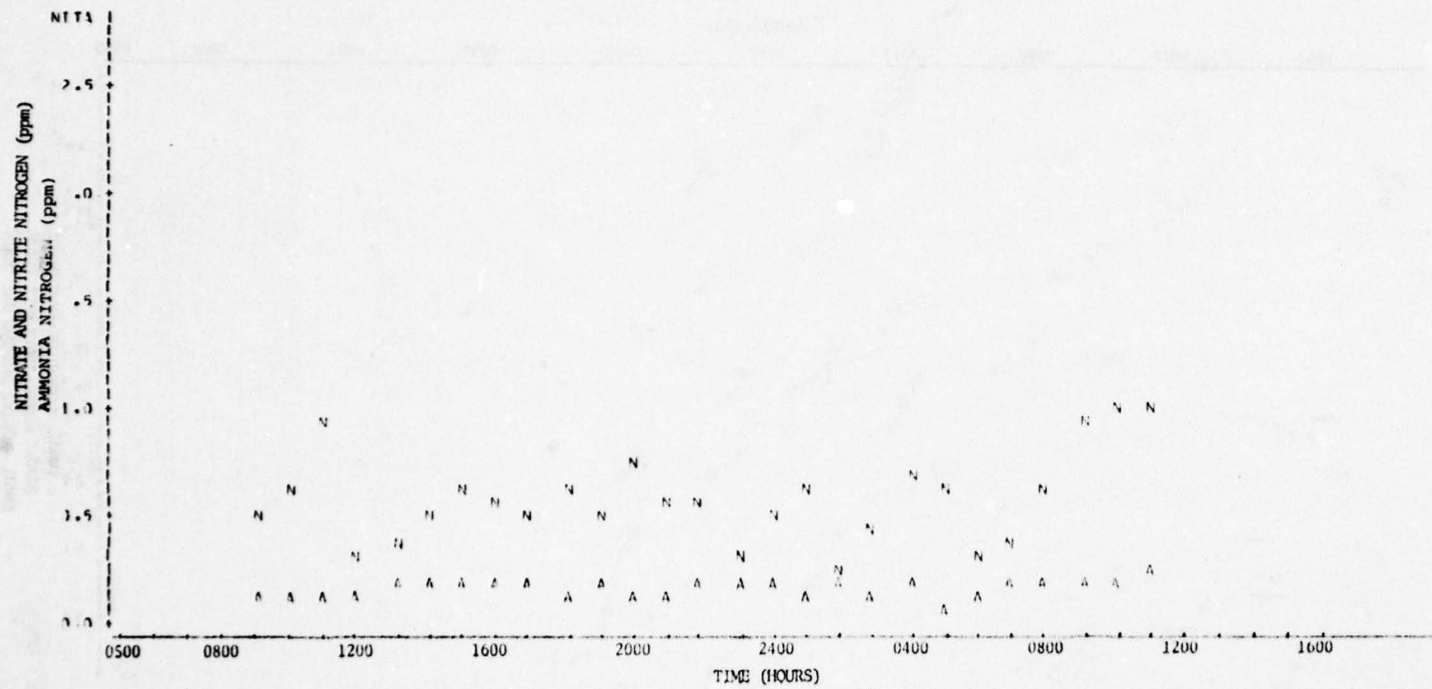
PLOT OF TIME*SAL LEGEND: SYMBOL USED IS S



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

21 - 22 April 1976

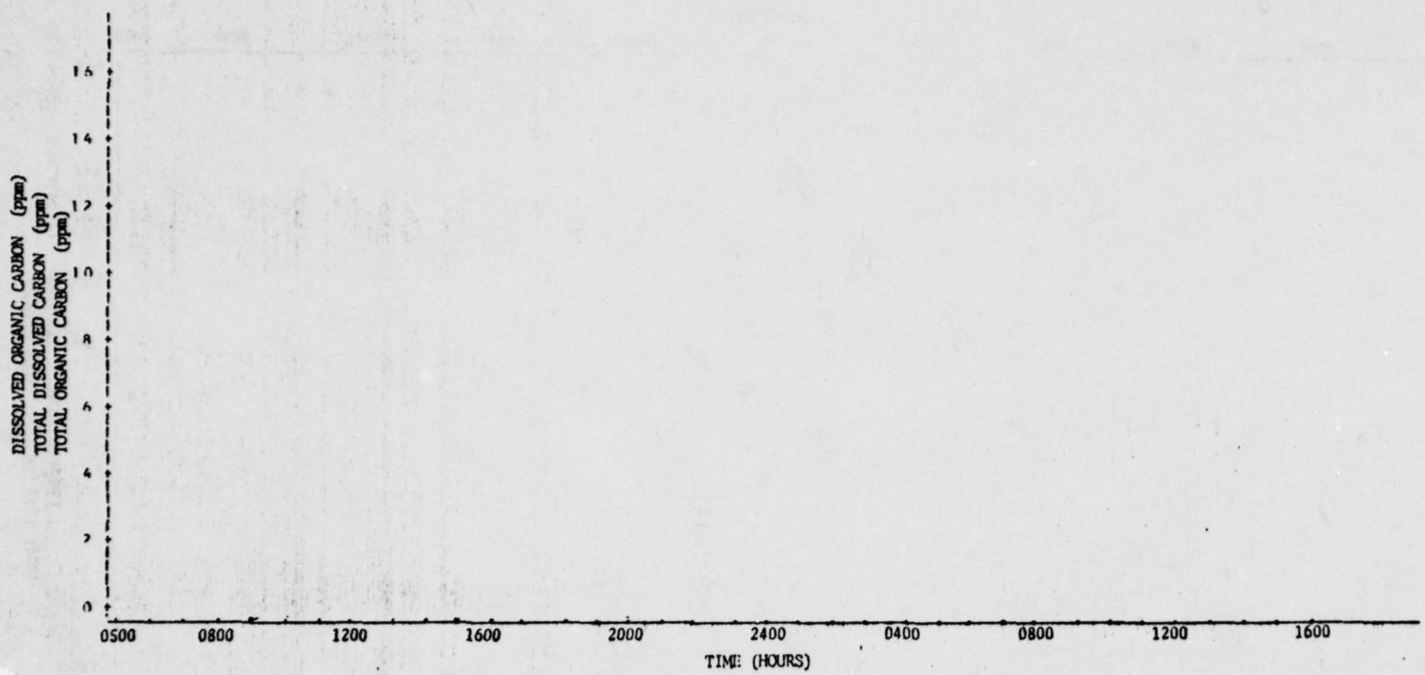
PLOT OF TIME*NITA LEGEND: SYMBOL USED IS CHARACTER N
PLOT OF TIME*AMMO LEGEND: SYMBOL USED IS CHARACTER A



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM

21 - 22 April 1976

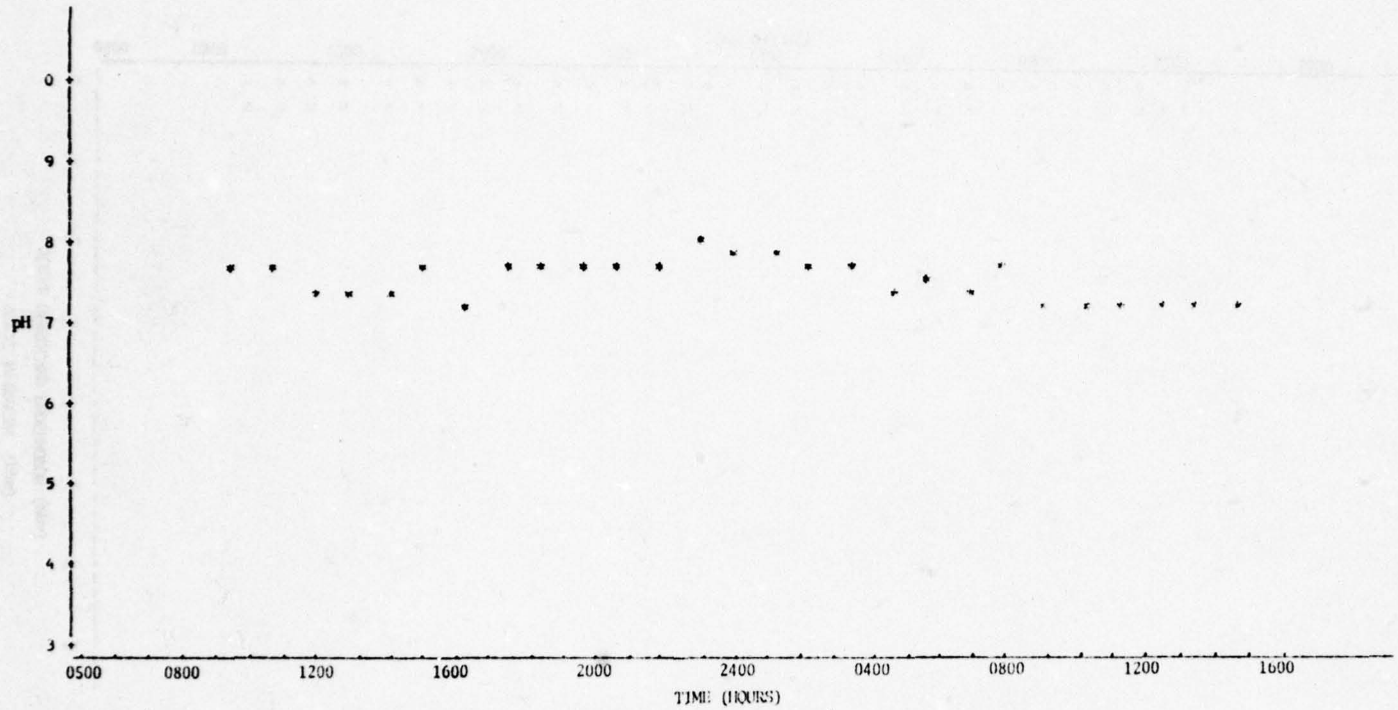
PLOT OF TIME*DOC   LEGEND: SYMBOL USED IS CHARACTER D
PLOT OF TIME*TDC   LEGEND: SYMBOL USED IS CHARACTER T
PLOT OF TIME*TOC   LEGEND: SYMBOL USED IS CHARACTER O



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

21 - 22 April 1976

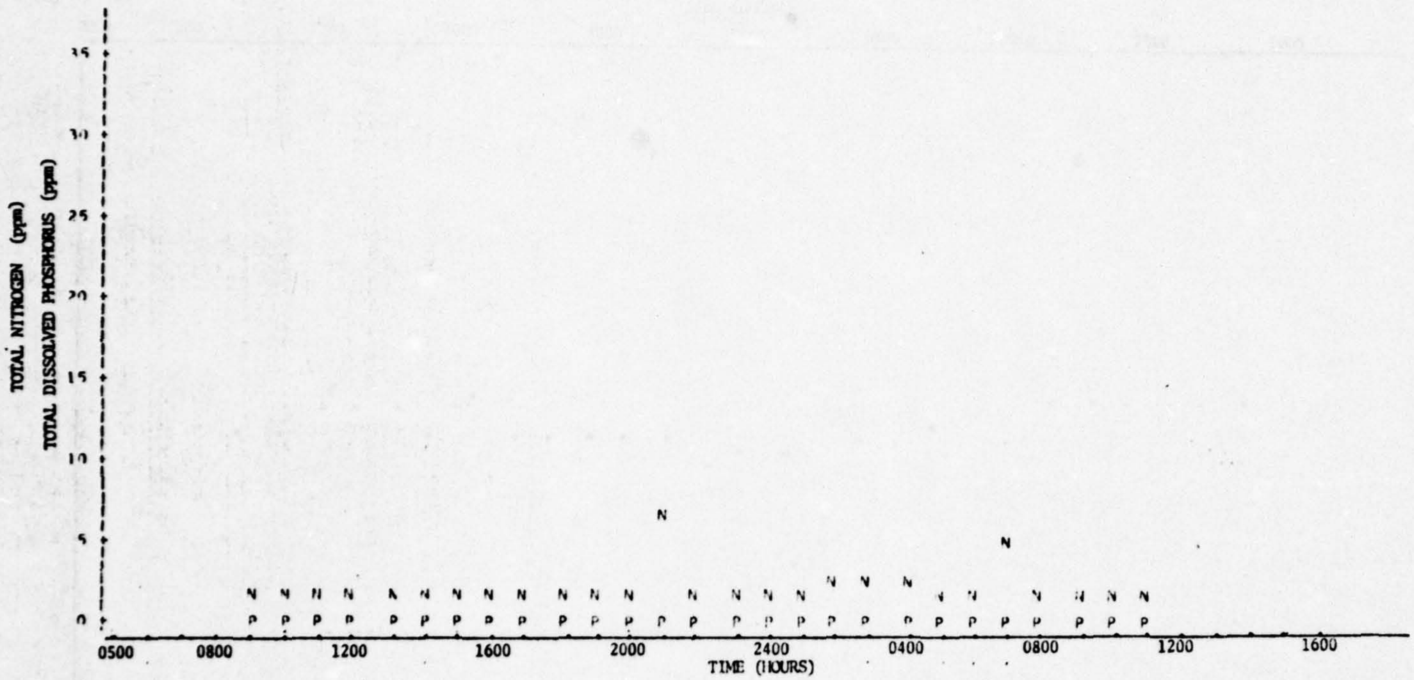
PLOT OF TIME*P LEGEND: SYMBOL USED IS *



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

21 - 22 April 1976

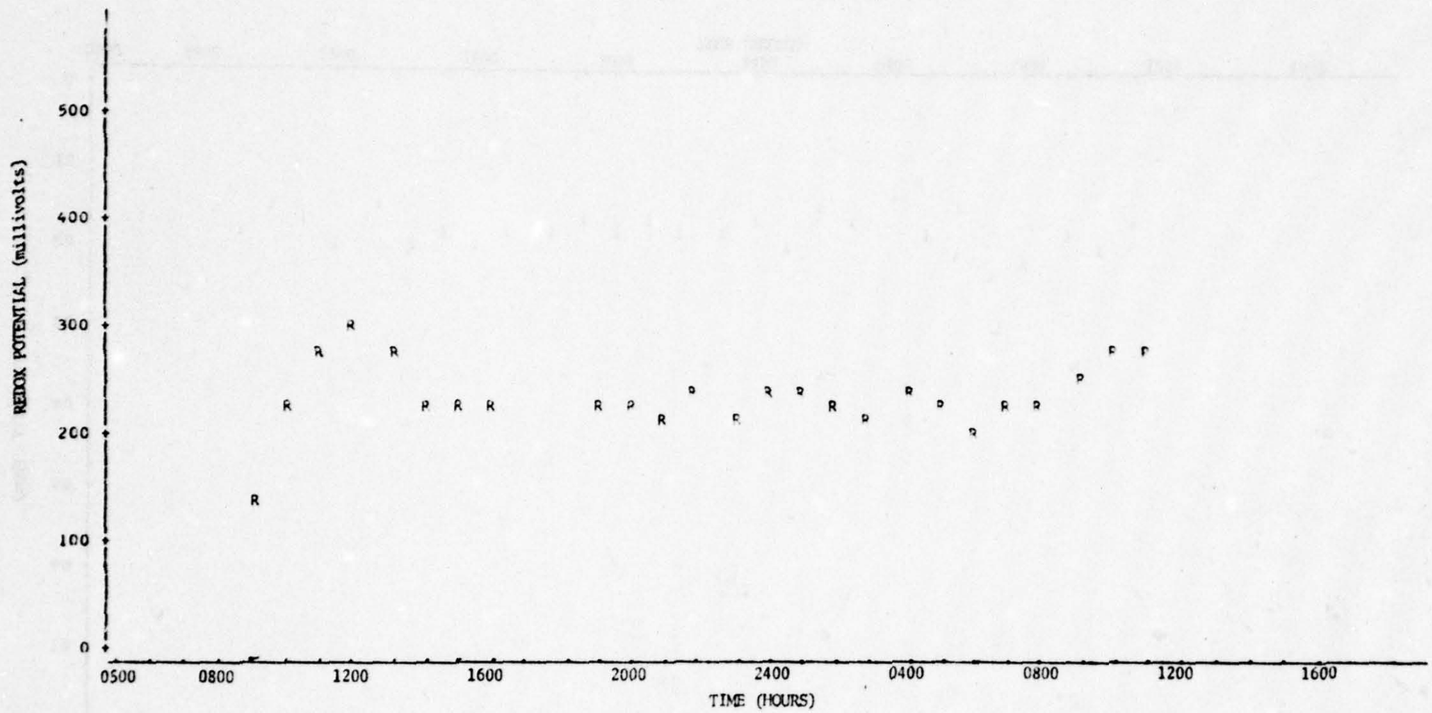
PLOT OF TIME*UPHOS LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*TNIT LEGEND: SYMBOL USED IS CHARACTER N



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM

21 - 22 April 1976

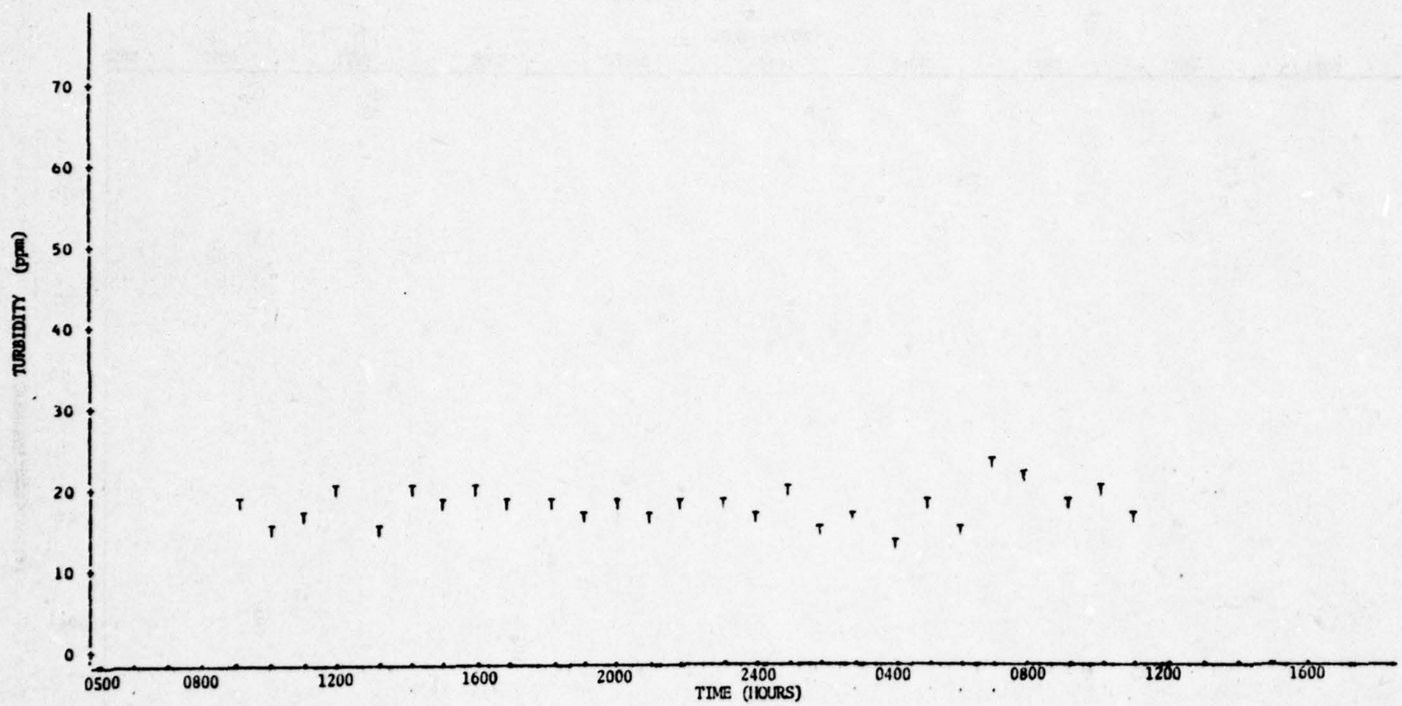
PLOT OF TIME*REDOX   LEGEND: SYMBOL USED IS R



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

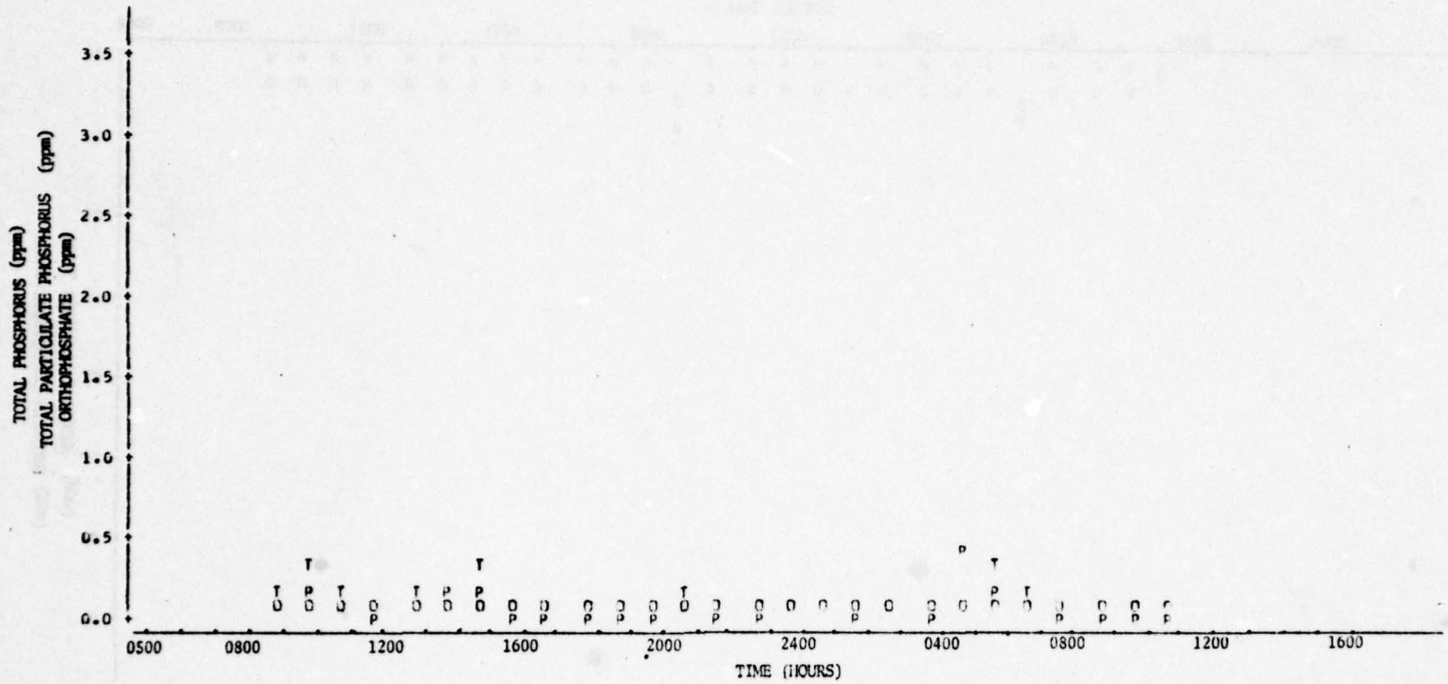
21 - 22 April 1976

PLOT OF TIME*TURB LEGEND: SYMBOL USED IS T



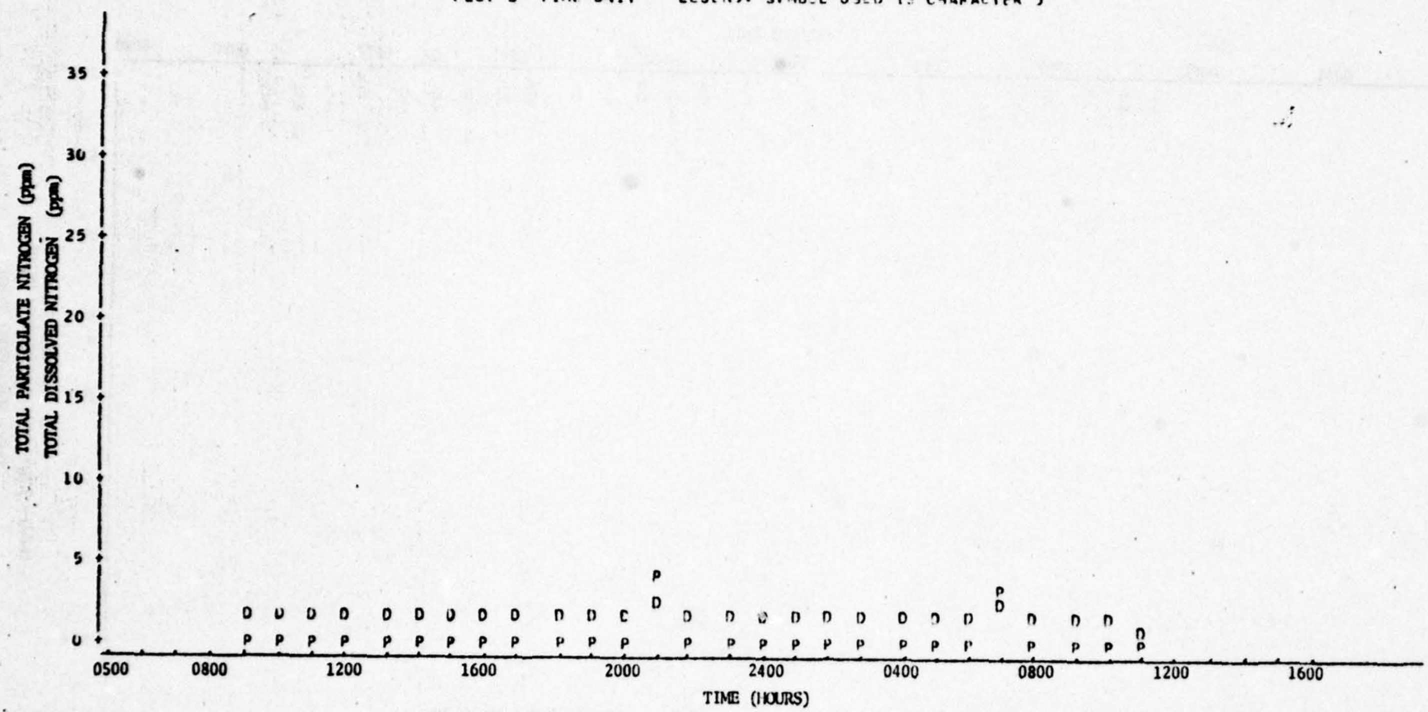
21 - 22 April 1976

PLOT OF TIME*TPHOS   LEGEND: SYMBOL USED IS CHARACTER T
PLOT OF TIME*PPHOS   LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*OPHOS   LEGEND: SYMBOL USED IS CHARACTER O



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM
21 - 22 April 1976

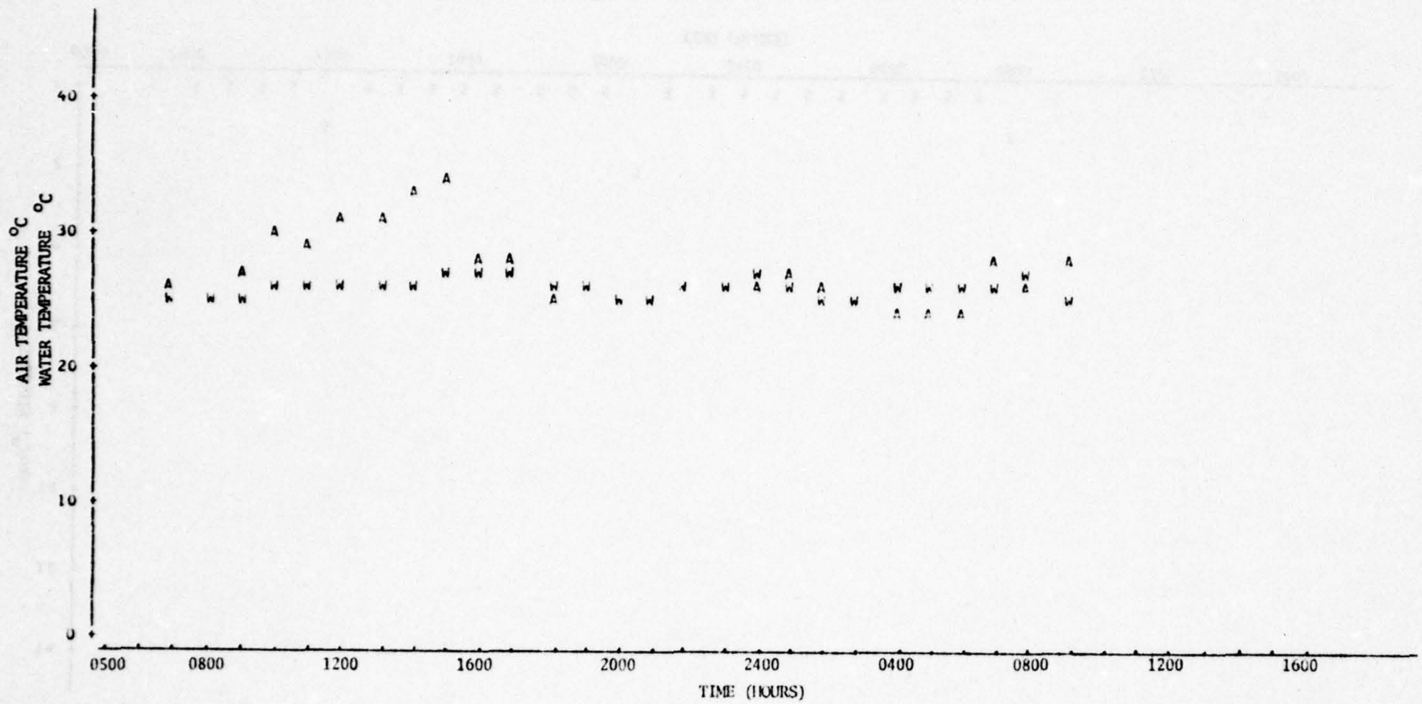
PLOT OF TIME*PNIT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*DNIT LEGEND: SYMBOL USED IS CHARACTER D



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

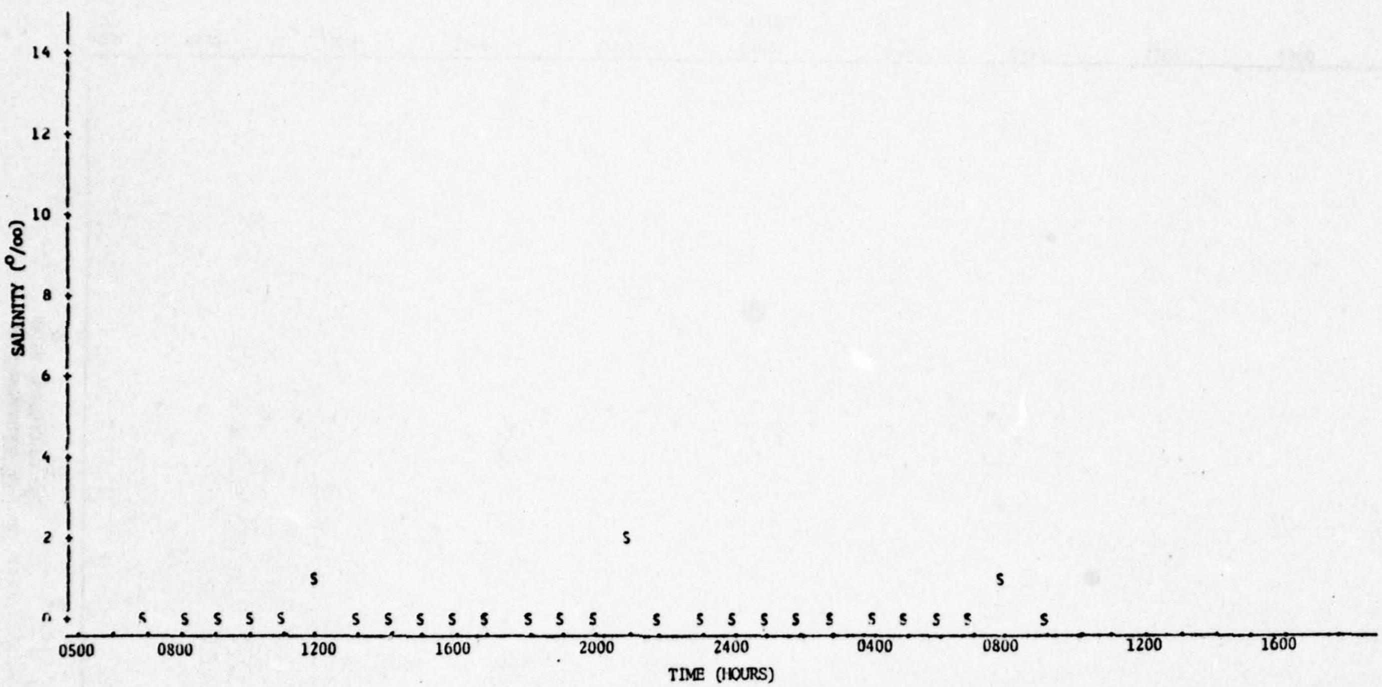
16 - 17 June 1976

PLOT OF TIME*AIR_T   LEGEND: SYMBOL USED IS CHARACTER A
PLOT OF TIME*WAT_T   LEGEND: SYMBOL USED IS CHARACTER W



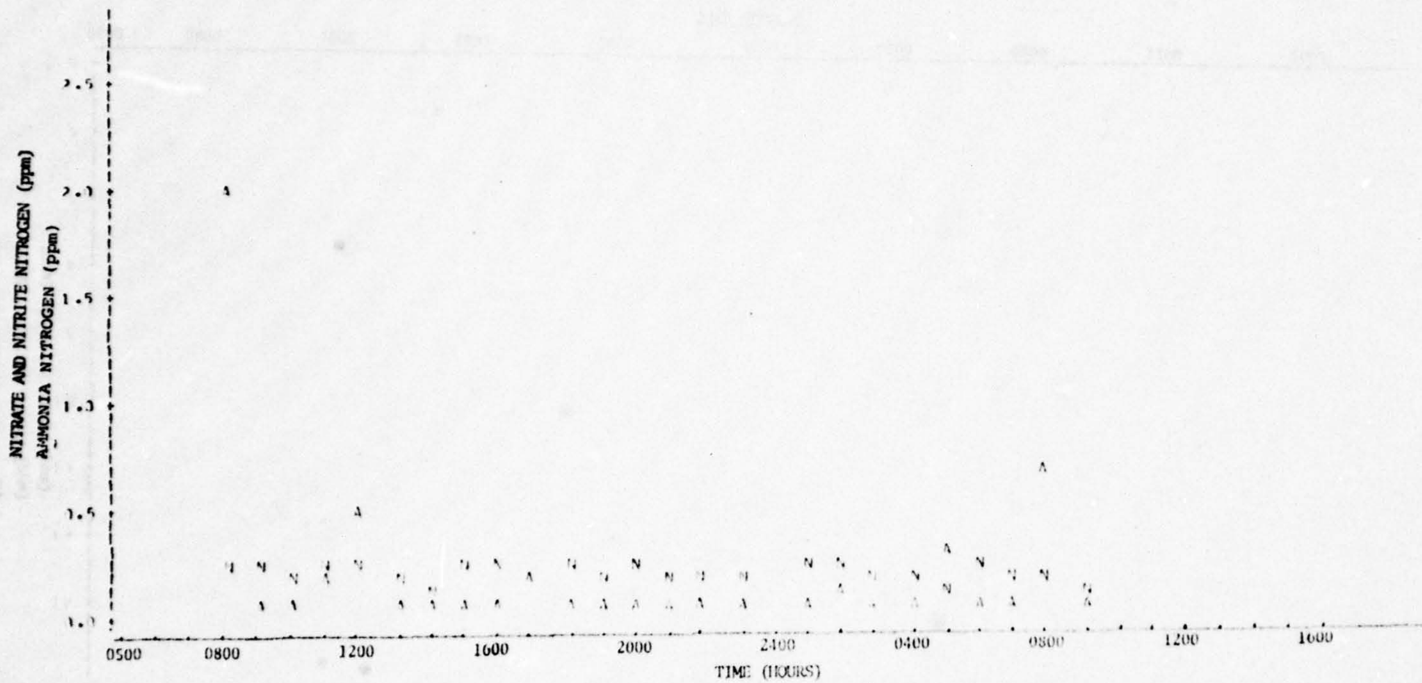
PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM
16 - 17 June 1976

PLOT OF TIME*SAL LEGEND: SYMBOL USED IS S



16 - 17 June 1976

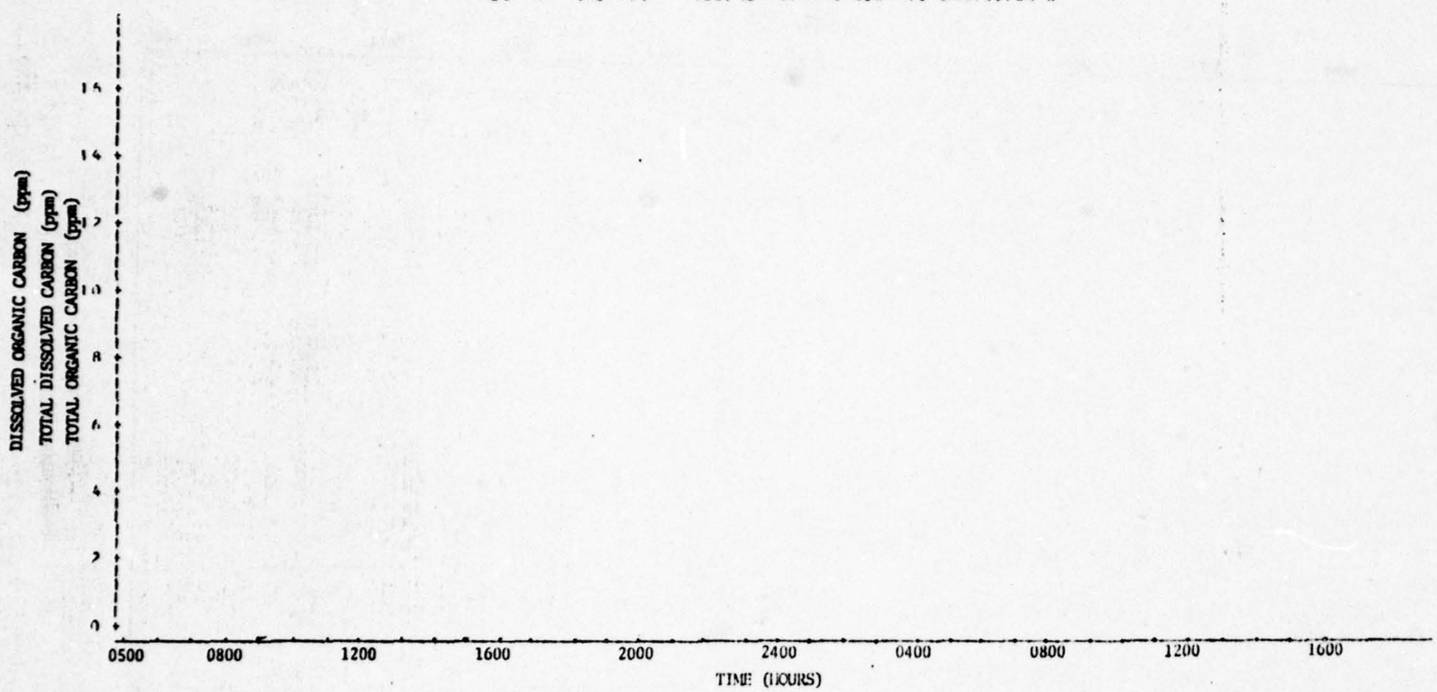
PLOT OF TIME*NITA   LEGEND: SYMBOL USED IS CHARACTER N
PLOT OF TIME*AMMO   LEGEND: SYMBOL USED IS CHARACTER A



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM   18

16 - 17 June 1976

PLOT OF TIME*DOC   LEGEND: SYMBOL USED IS CHARACTER D
PLOT OF TIME*TDC   LEGEND: SYMBOL USED IS CHARACTER T
PLOT OF TIME*TOC   LEGEND: SYMBOL USED IS CHARACTER O



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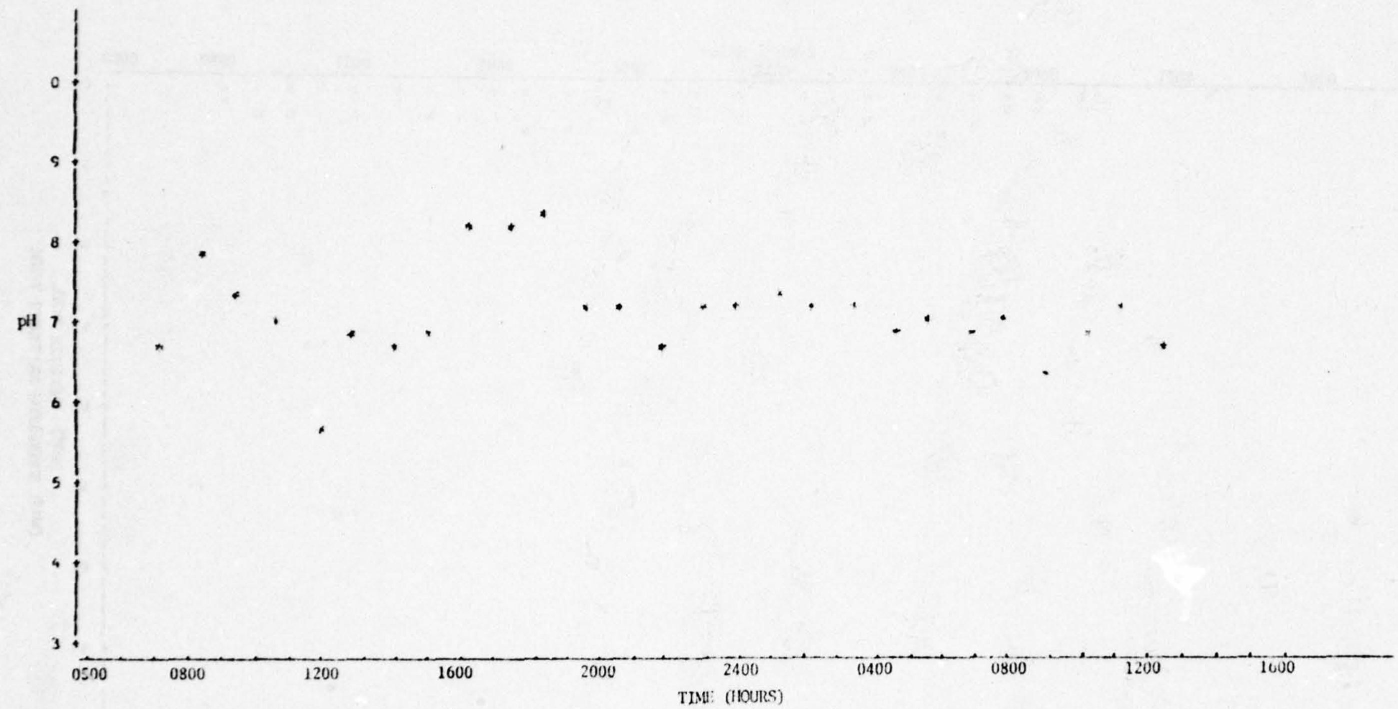
PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM

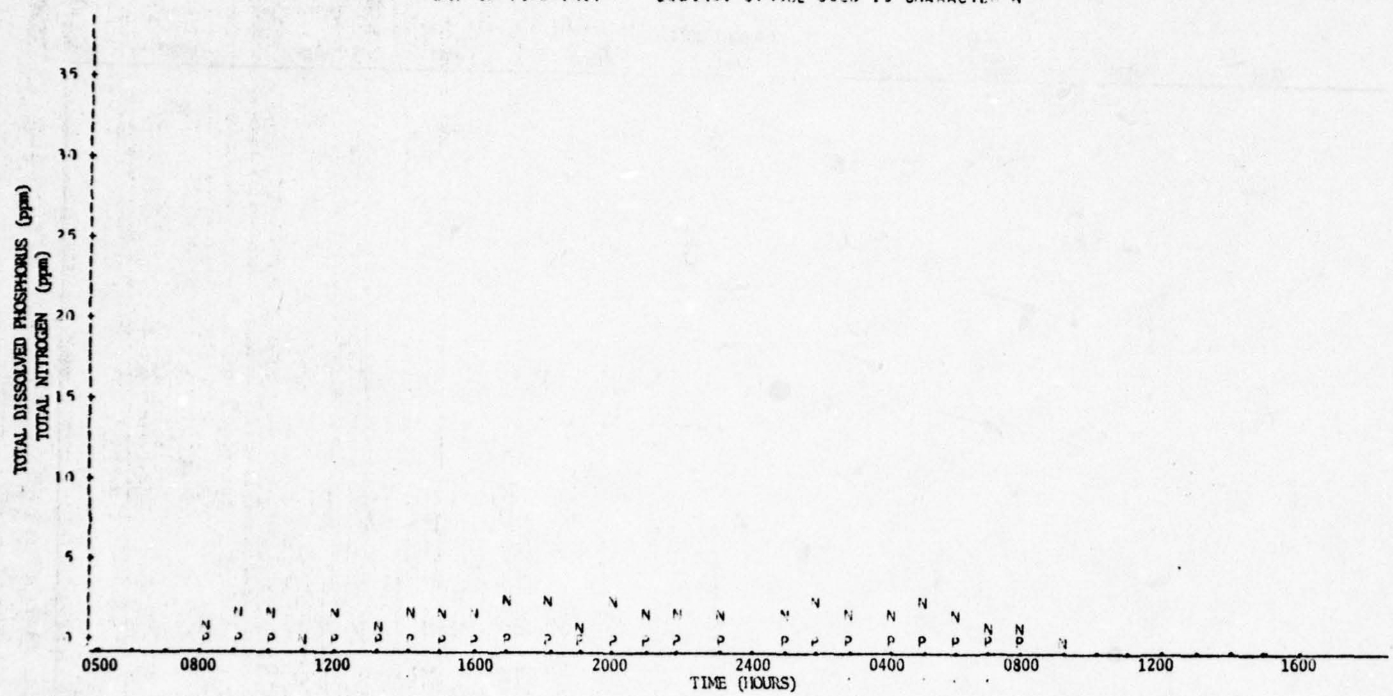
16 - 17 June 1976

PLOT OF TIME*P   LEGEND: SYMBOL USED IS *



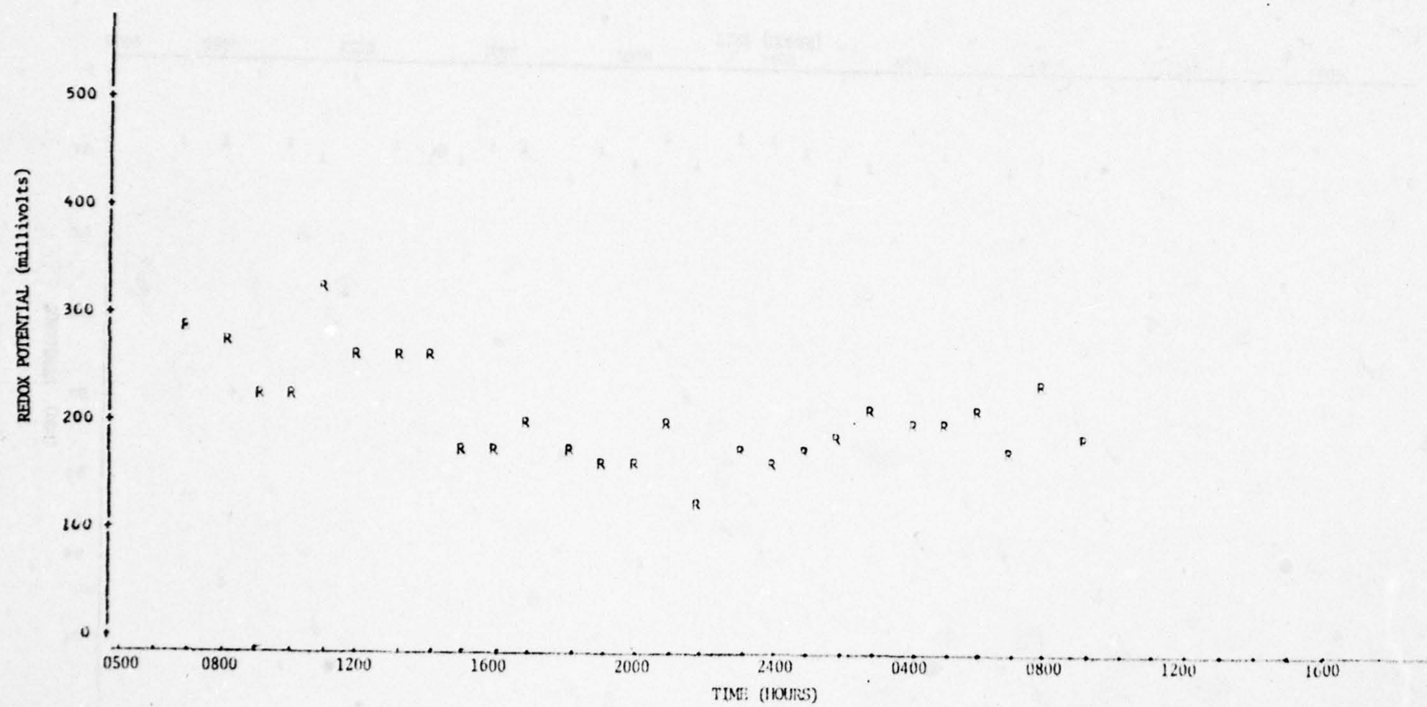
16 - 17 June 1976

PLOT OF TIME*OPHUS LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*INIT LEGEND: SYMBOL USED IS CHARACTER N



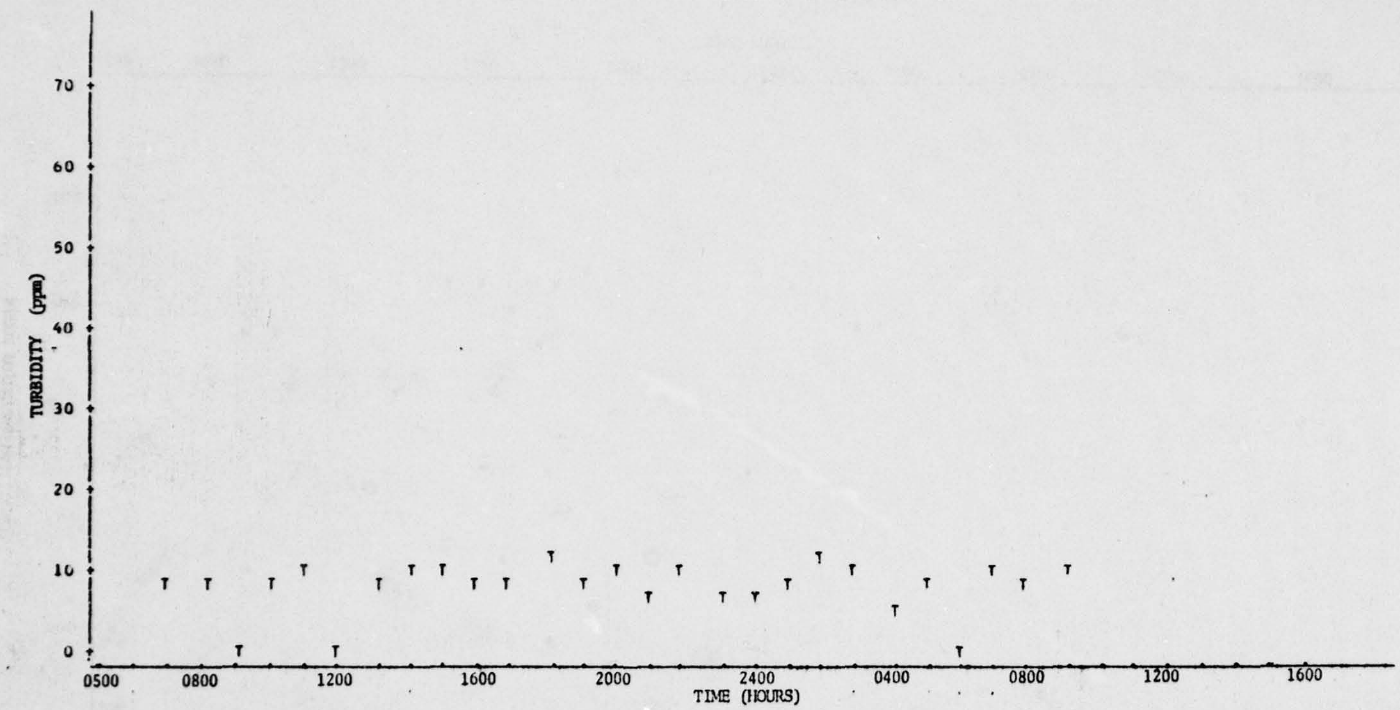
16 - 17 June 1976

PLOT OF TIME*REDOX   LEGEND: SYMBOL USED IS R



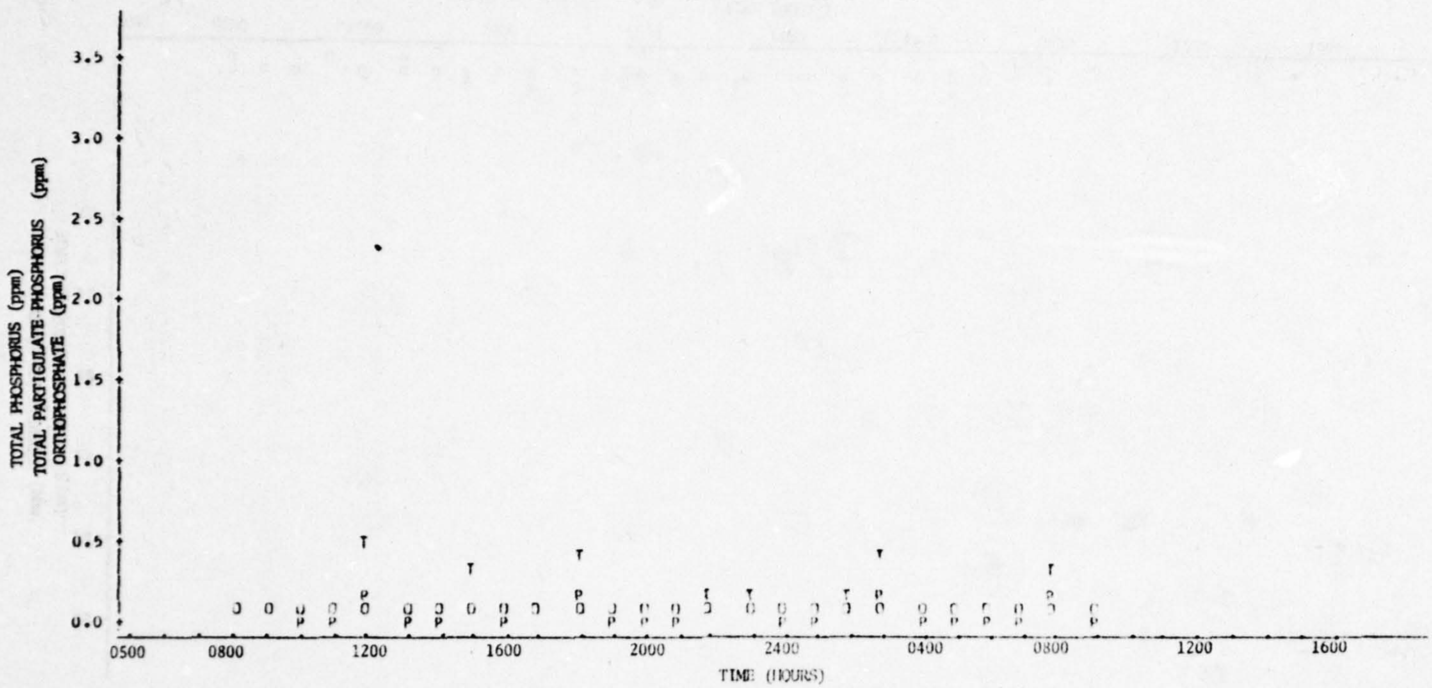
16 - 17 June 1976

PLOT OF TIME*TURB   LEGEND: SYMBOL USED IS T



16 - 17 June 1976

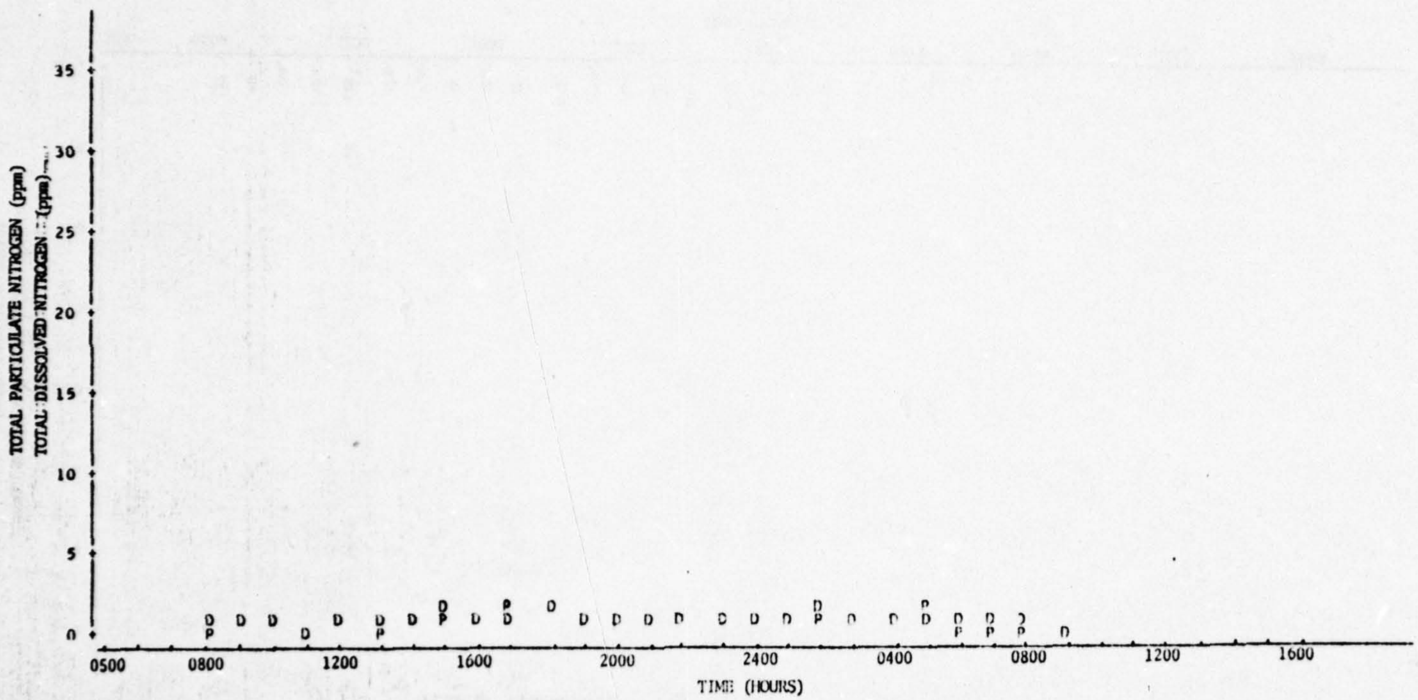
PLOT OF TIME*TPHOS   LEGEND: SYMBOL USED IS CHARACTER T
PLOT OF TIME*PPHOS   LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*OPHOS   LEGEND: SYMBOL USED IS CHARACTER O



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

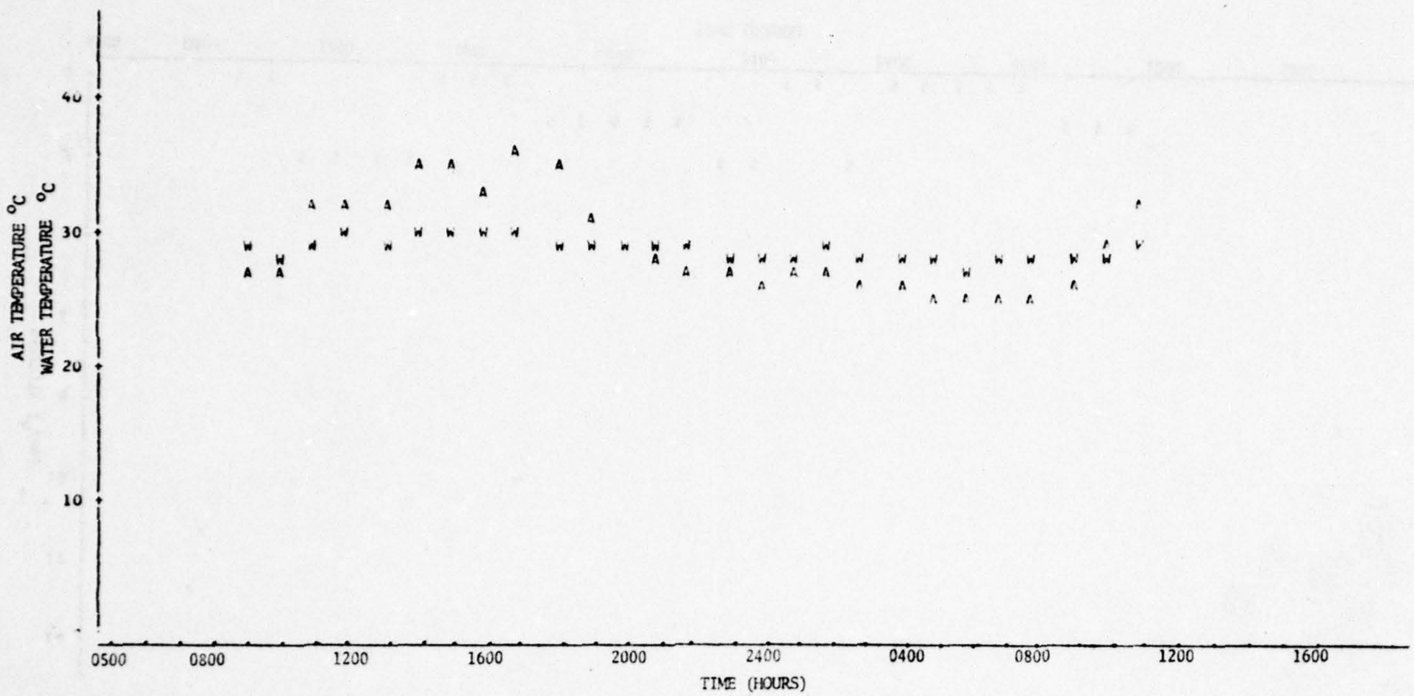
16 - 17 June 1976

PLOT OF TIME*PNIT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*DNIT LEGEND: SYMBOL USED IS CHARACTER D



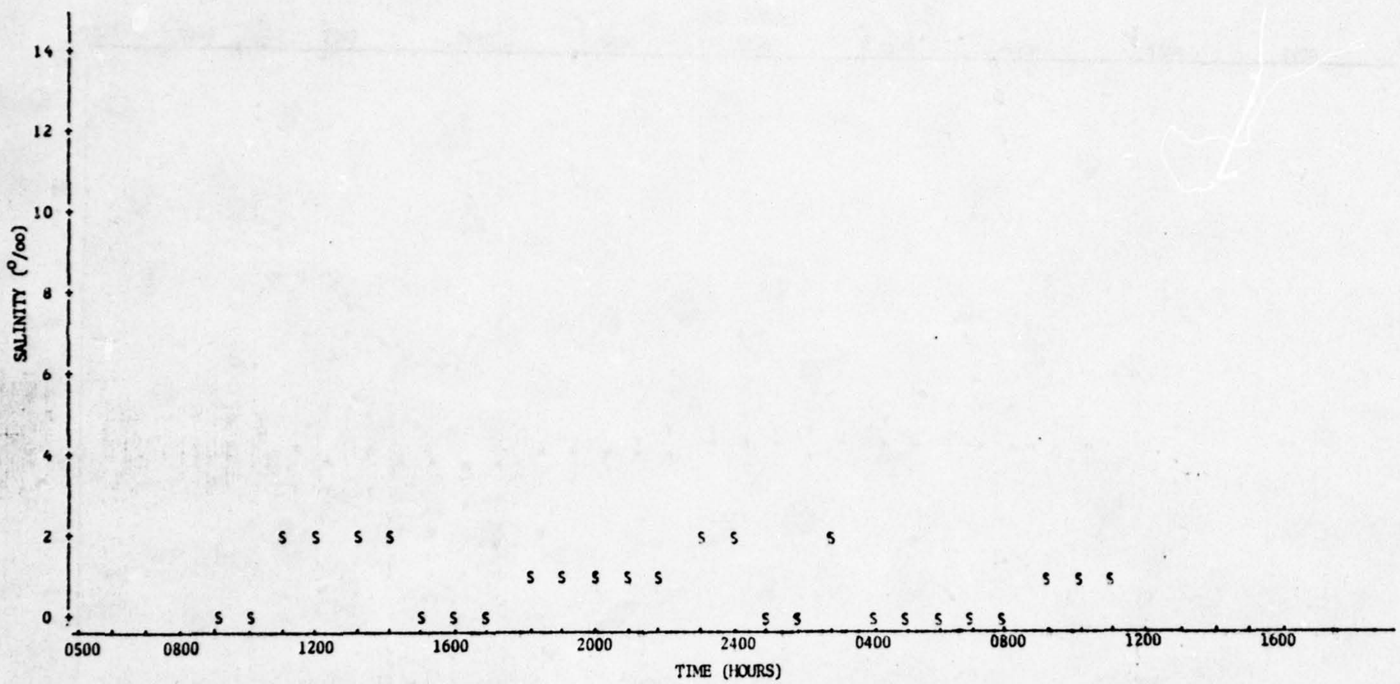
11 - 12 August 1976

PLOT OF TIME*AIR_T LEGEND: SYMBOL USED IS CHARACTER A
PLOT OF TIME*WAT_T LEGEND: SYMBOL USED IS CHARACTER W



11 - 12 August 1976

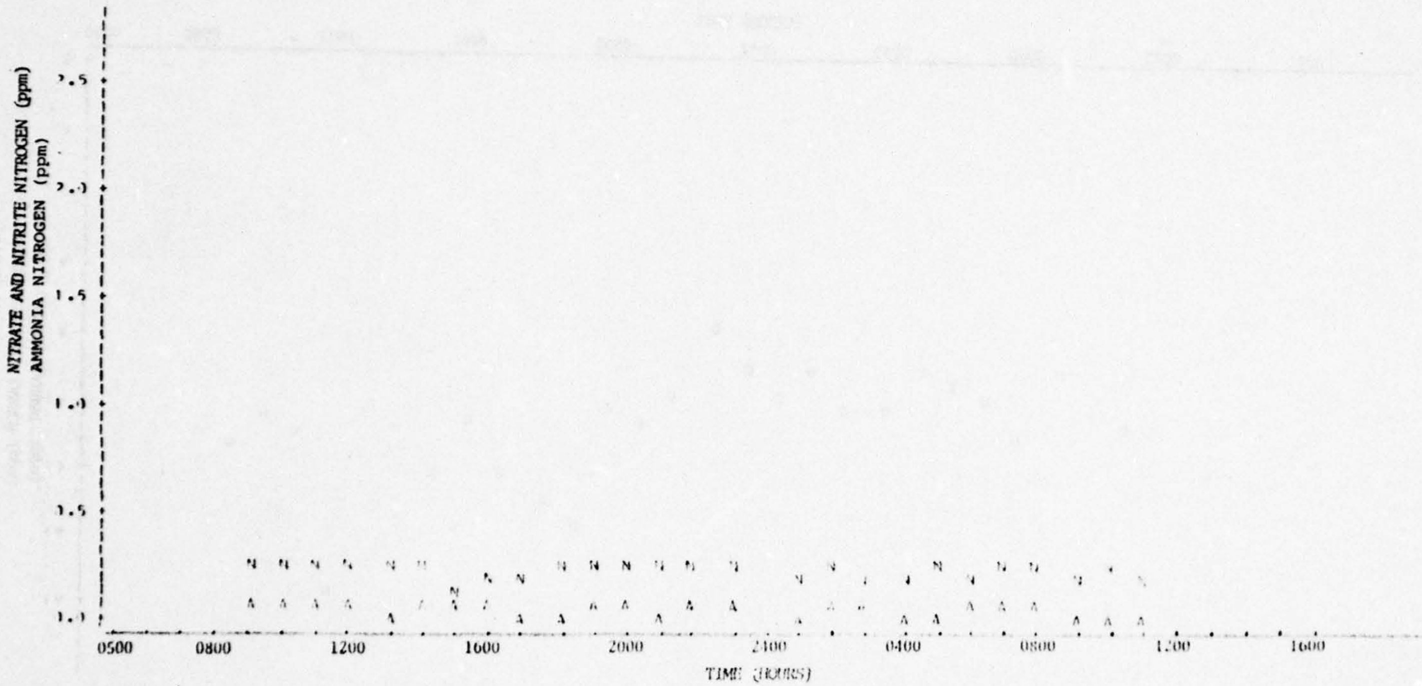
PLOT OF TIME*SAL LEGEND: SYMBOL USED IS S



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM   19

11 - 12 August 1976

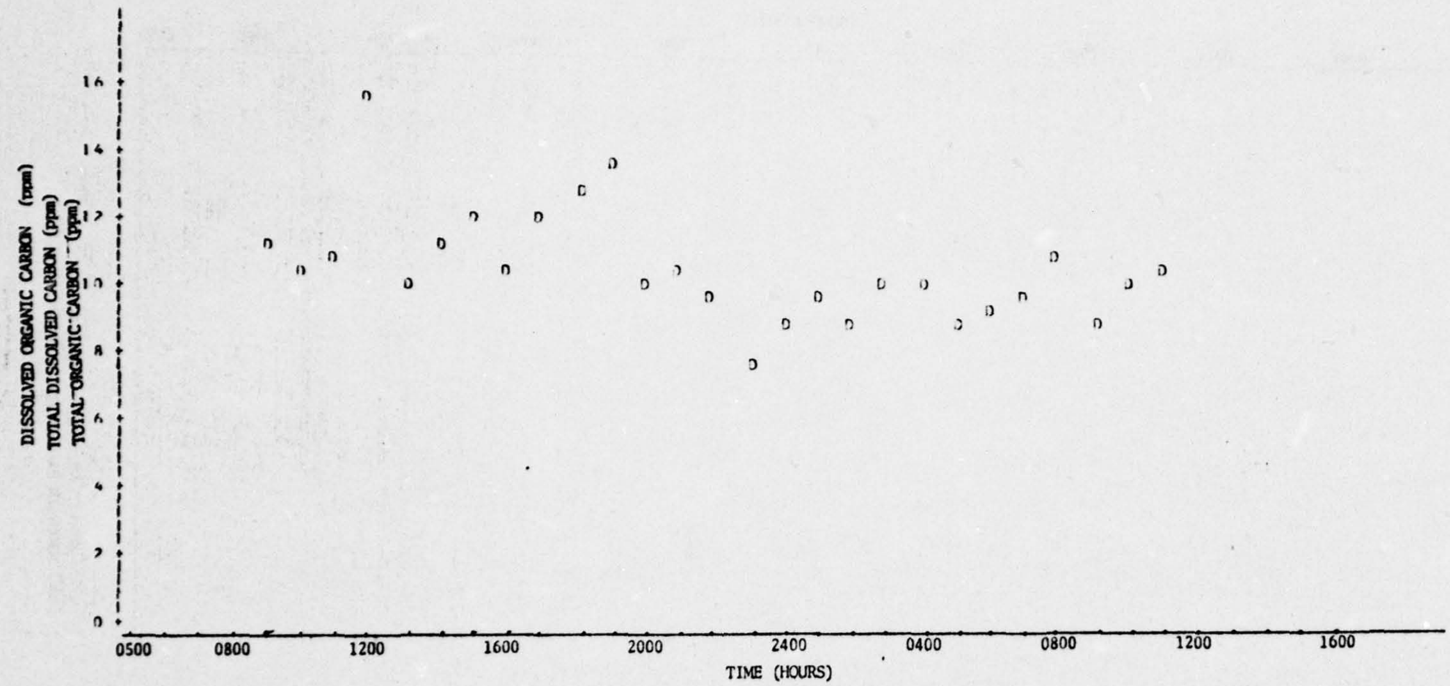
PLOT OF TIME*NITA   LEGEND: SYMBOL USED IS CHARACTER N
PLOT OF TIME*AMMO   LEGEND: SYMBOL USED IS CHARACTER A



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

11 - 12 August 1976

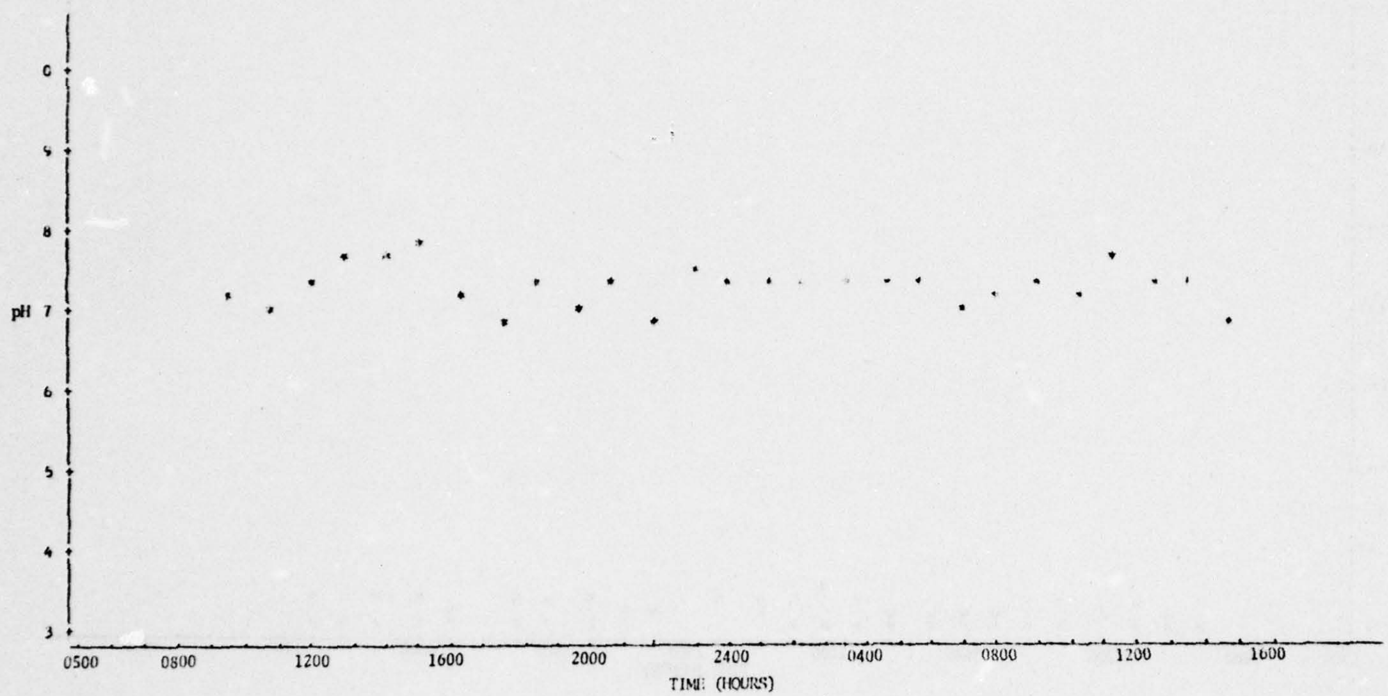
PLOT OF TIME*DOC LEGEND: SYMBOL USED IS CHARACTER D
PLOT OF TIME*TDC LEGEND: SYMBOL USED IS CHARACTER T
PLOT OF TIME*TOC LEGEND: SYMBOL USED IS CHARACTER O



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM

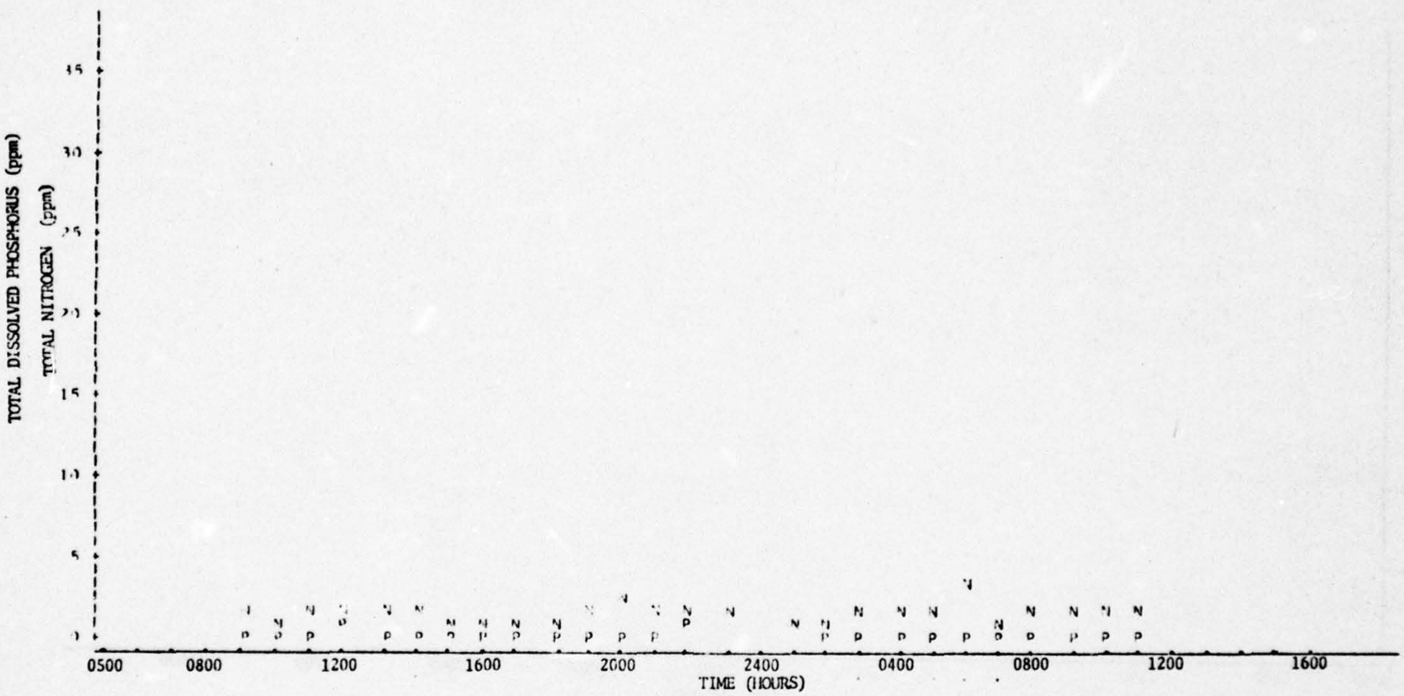
11 - 12 August 1976

PLOT OF TIME*P   LEGEND: SYMBOL USED IS *



11 - 12 August 1976

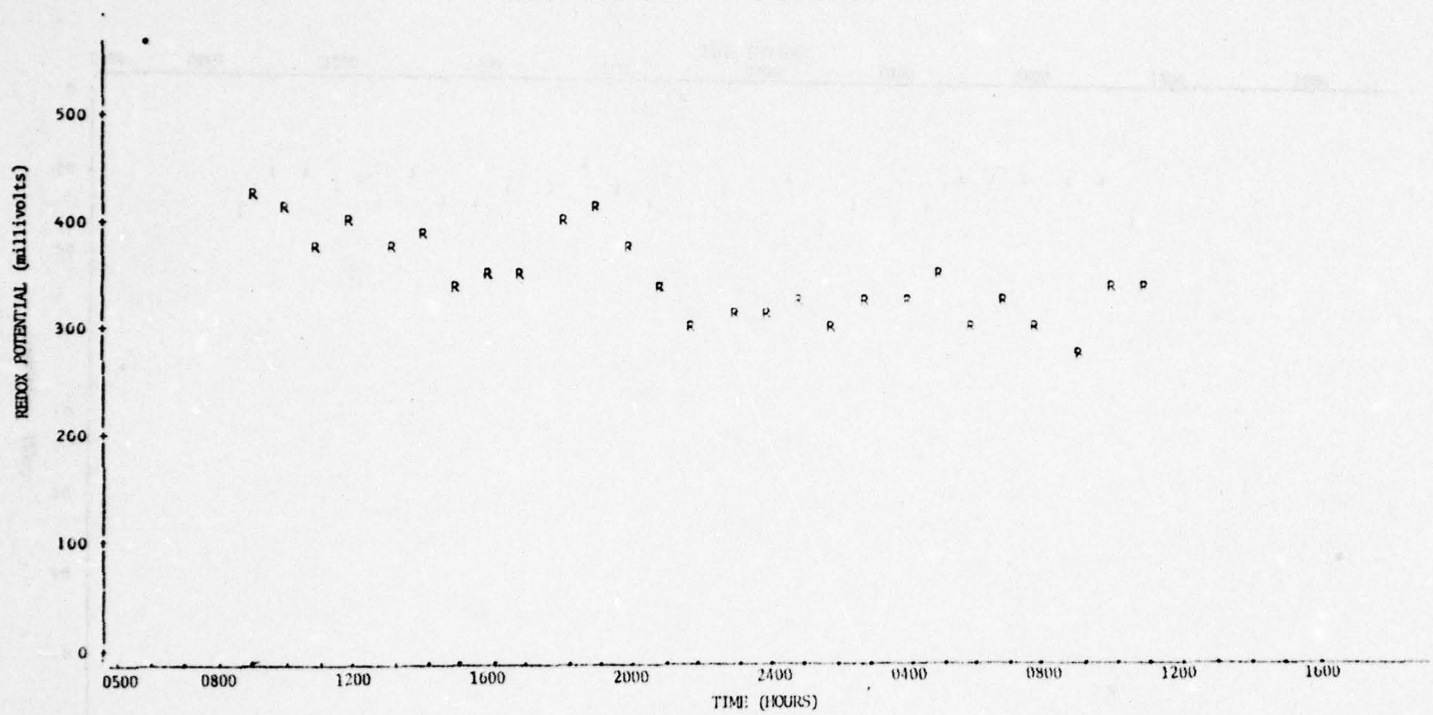
PLOT OF TIME*DPHOS LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*TNIT LEGEND: SYMBOL USED IS CHARACTER N



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM 50

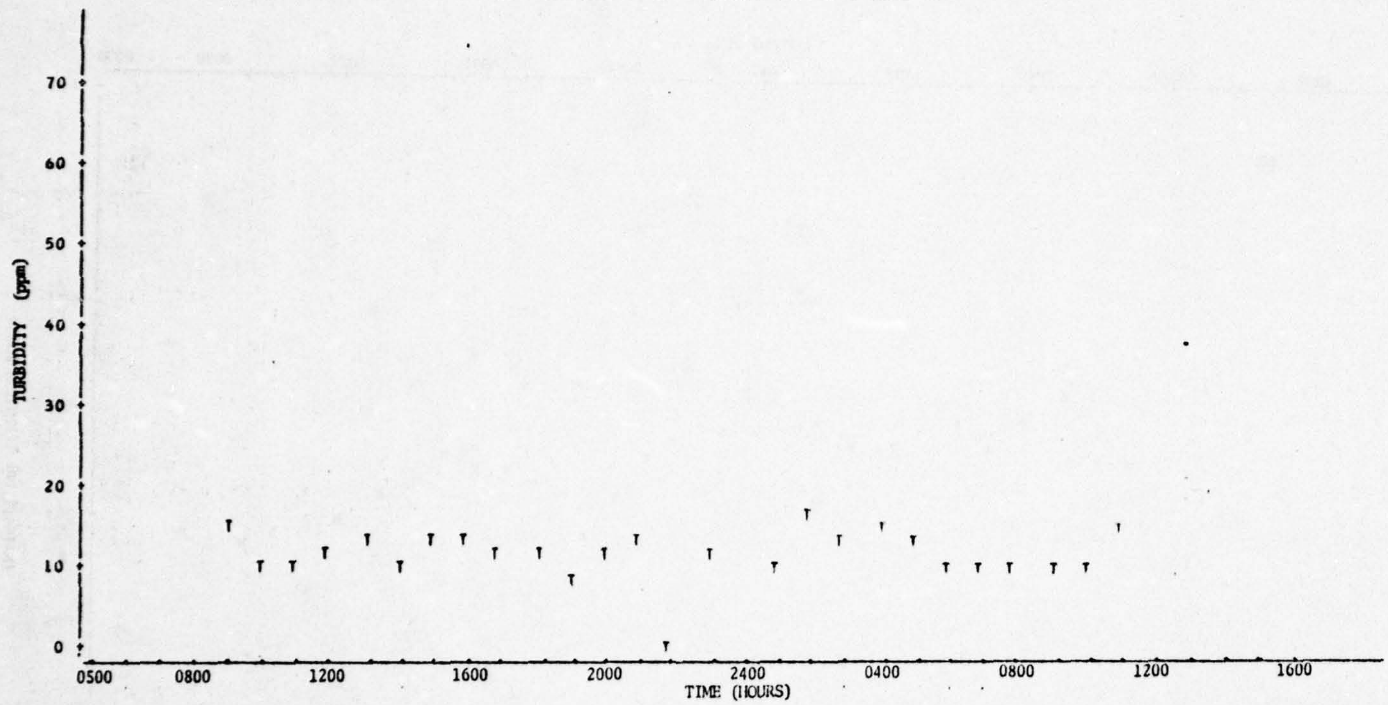
11 - 12 August 1976

PLOT OF TIME*REDOX LEGEND: SYMBOL USED IS R



11 - 12 August 1976

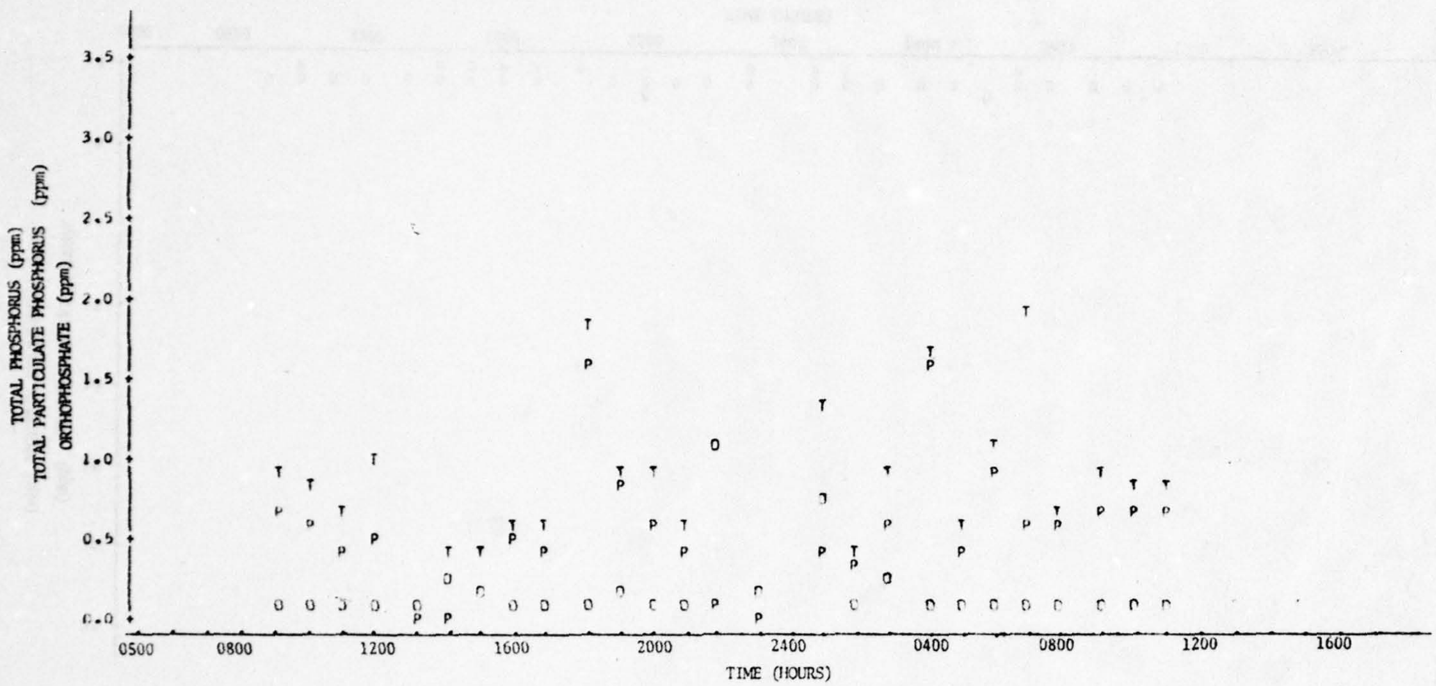
PLOT OF TIME*TURB LEGEND: SYMBOL USED IS T



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

11 - 12 August 1976

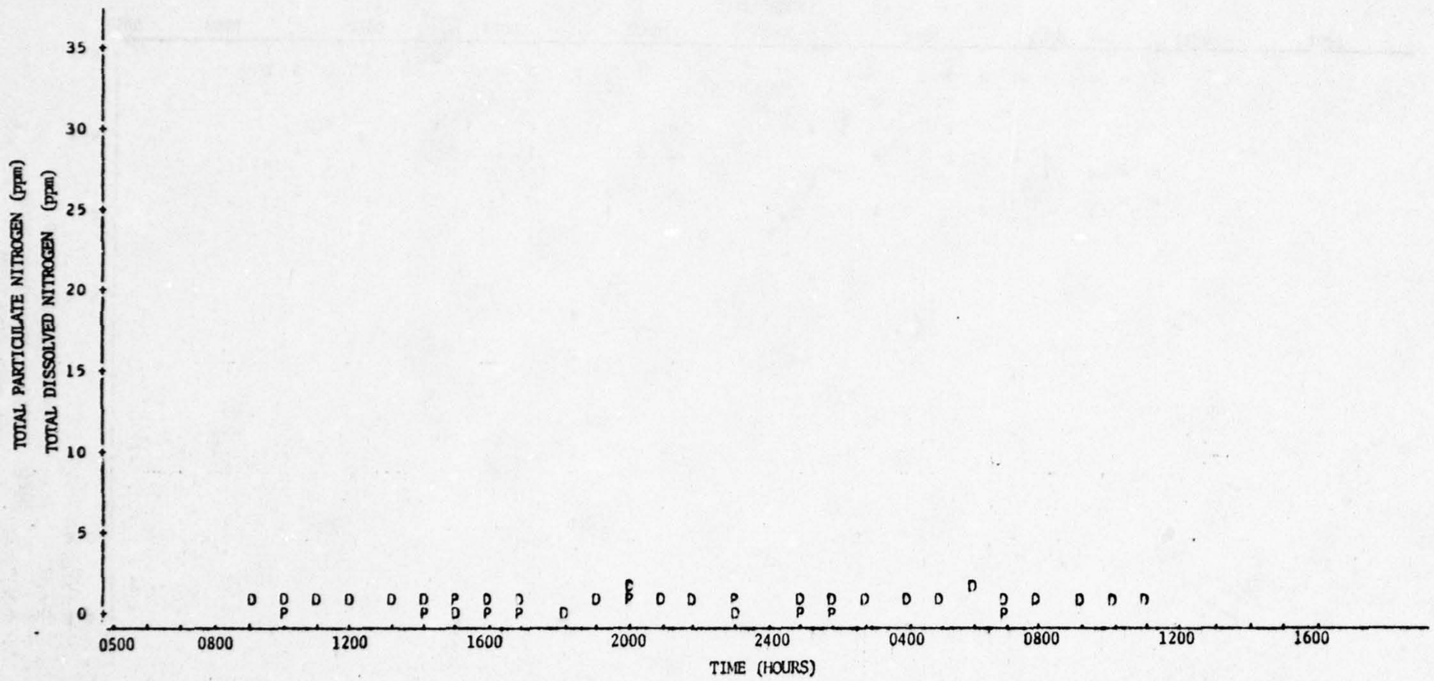
PLOT OF TIME*TPHOS LEGEND: SYMBOL USED IS CHARACTER T
PLOT OF TIME*PPHOS LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*OPHOS LEGEND: SYMBOL USED IS CHARACTER O



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

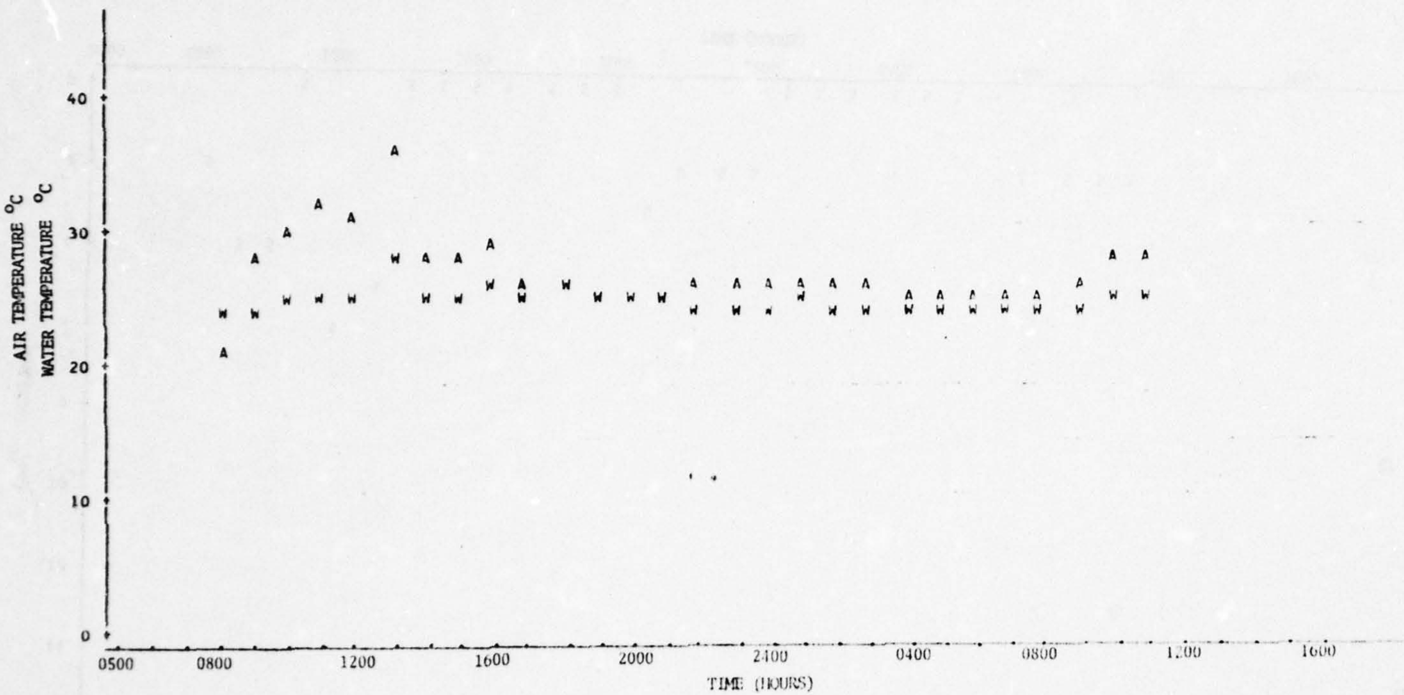
11 - 12 August 1976

PLOT OF TIME*PNIT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*DNIT LEGEND: SYMBOL USED IS CHARACTER D



6 - 7 October 1976

PLOT OF TIME*AIR_T   LEGEND: SYMBOL USED IS CHARACTER A
PLOT OF TIME*WAT_T   LEGEND: SYMBOL USED IS CHARACTER W



AD-A062 867 GEORGIA UNIV BRUNSWICK MARINE EXTENSION SERVICE F/G 13/2
HABITAT DEVELOPMENT FIELD INVESTIGATIONS BUTTERMILK SOUND MARSH--ETC(U)
JUL 78 R J REIMOLD, M A HARDISKY, P C ADAMS DACW21-75-C-0074
UNCLASSIFIED WES-TR-D-78-26-APP-A NL

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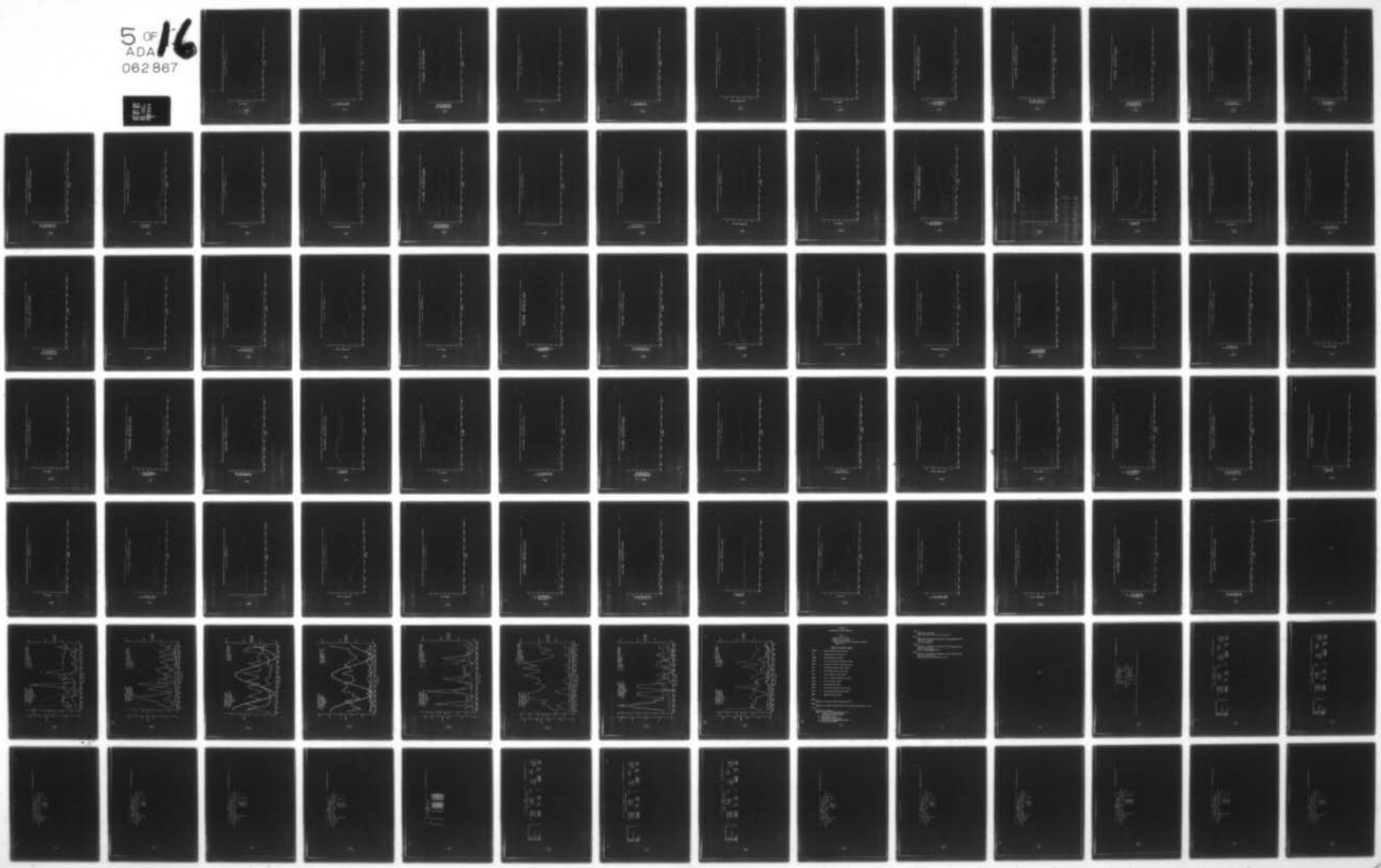
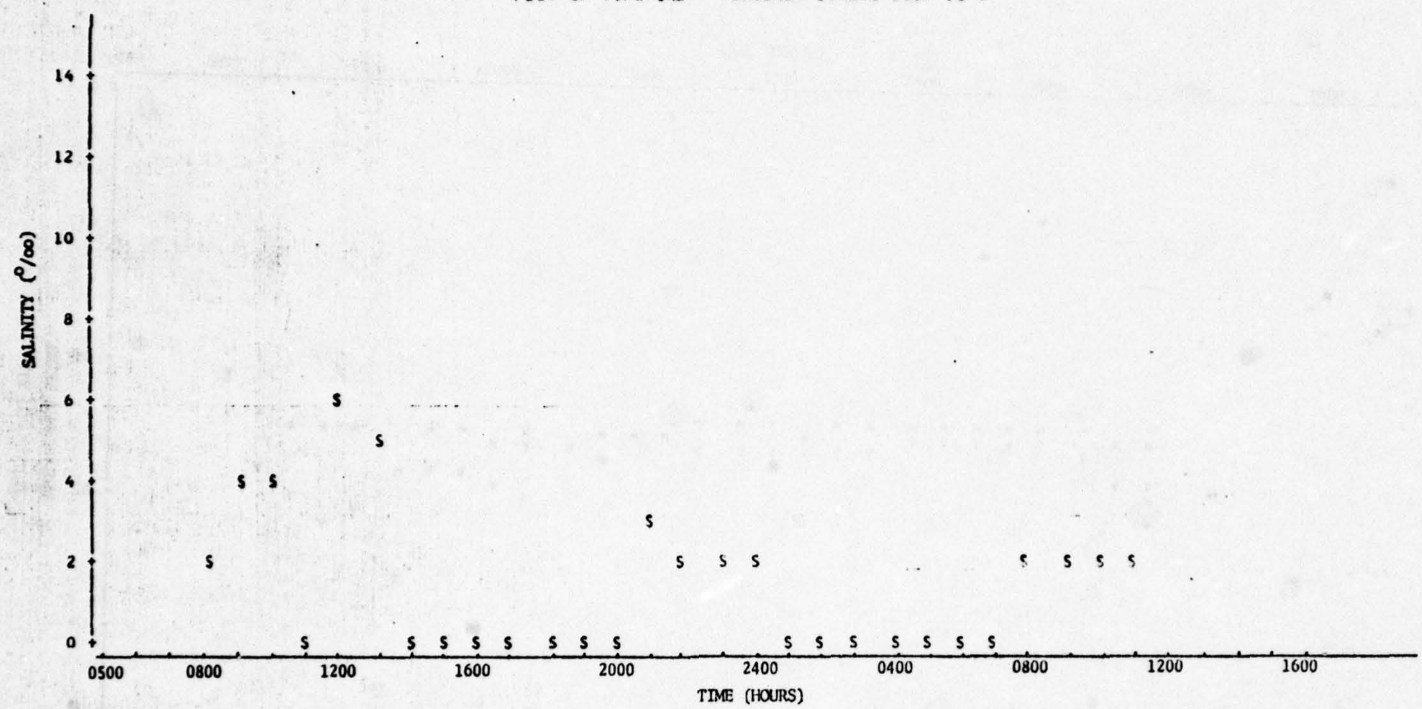



86

PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM   20

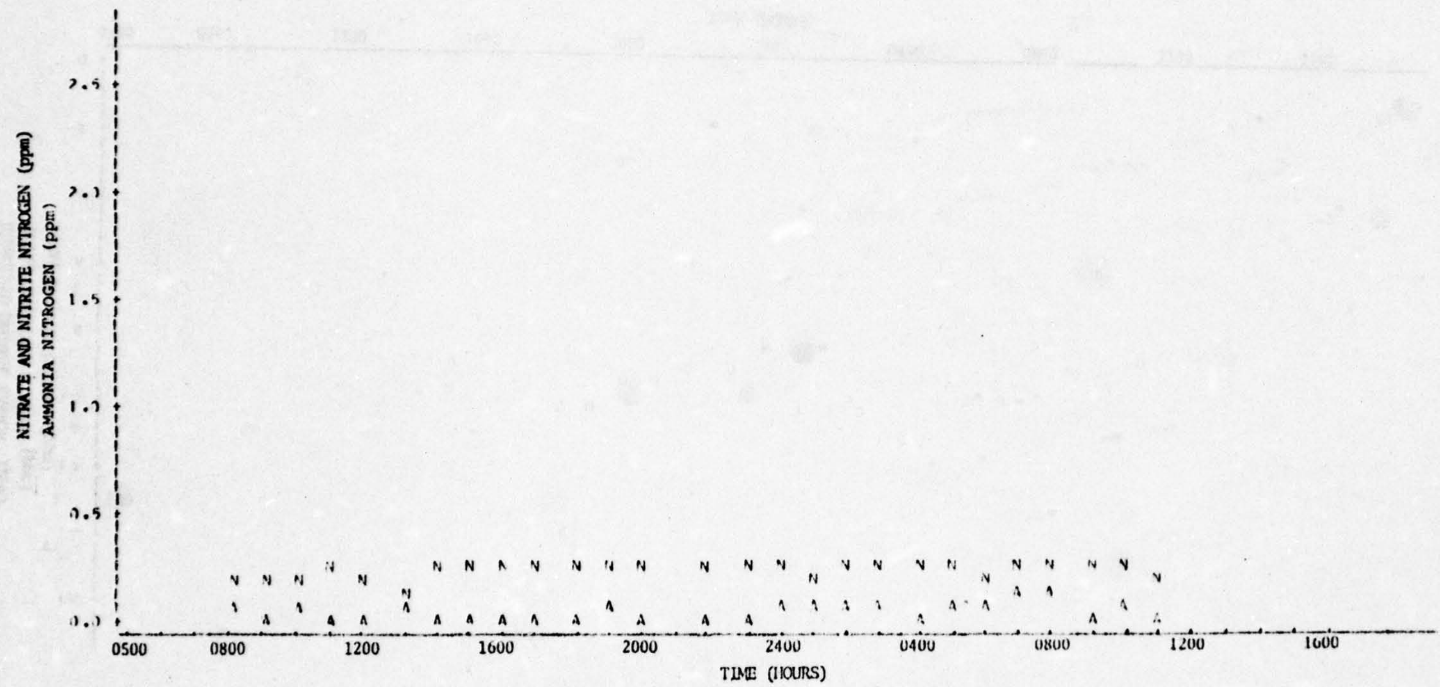
6 - 7 October 1976

PLOT OF TIME*SAL   LEGEND: SYMBOL USED IS S



6 - 7 October 1976

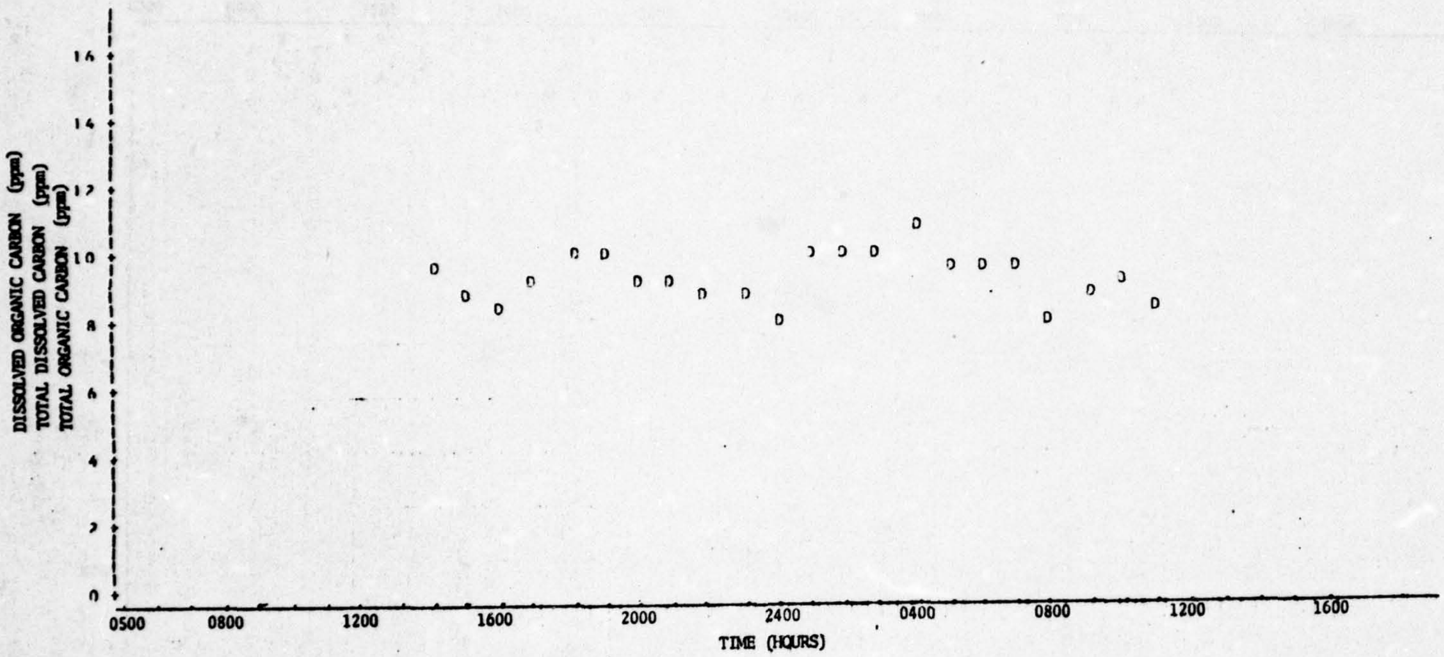
PLOT OF TIME*NITA   LEGEND: SYMBOL USED IS CHARACTER N
PLOT OF TIME*AMMO   LEGEND: SYMBOL USED IS CHARACTER A



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM

6 - 7 October 1976

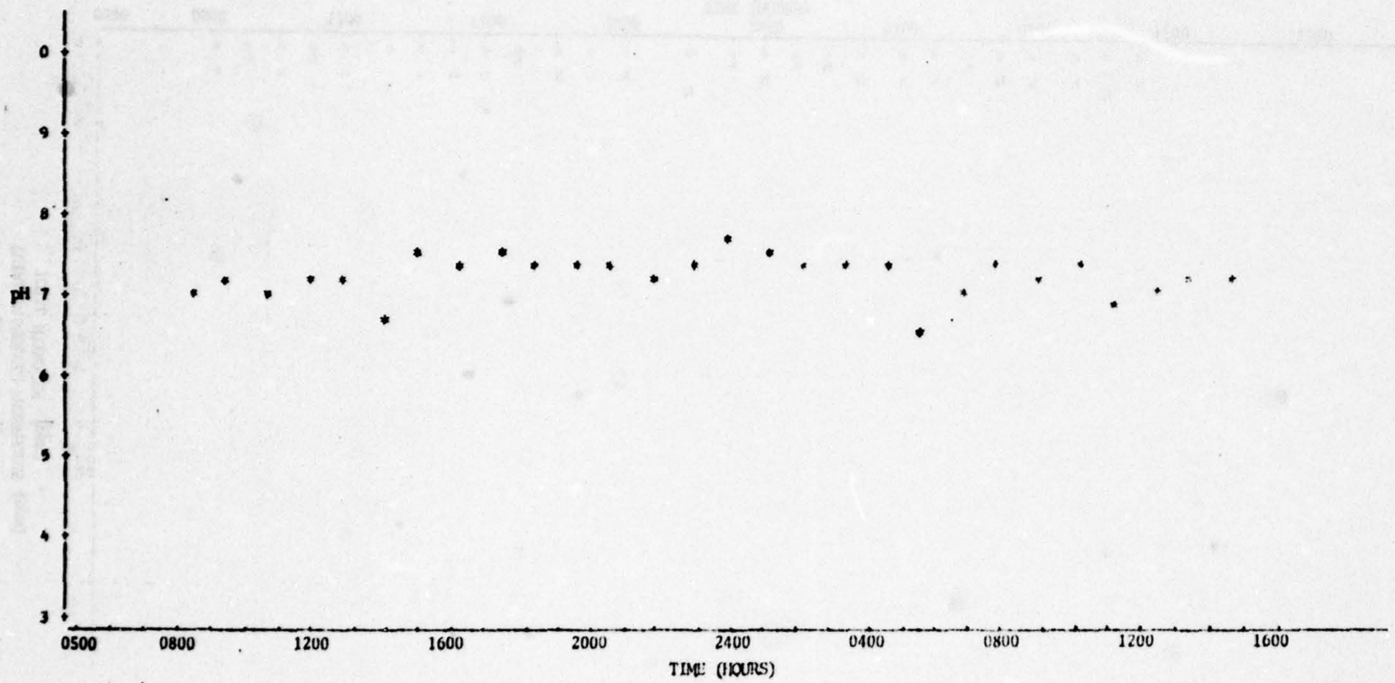
PLOT OF TIME*DOC   LEGEND: SYMBOL USED IS CHARACTER D
PLOT OF TIME*TDC   LEGEND: SYMBOL USED IS CHARACTER T
PLOT OF TIME*TOC   LEGEND: SYMBOL USED IS CHARACTER O



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

6 - 7 October 1976

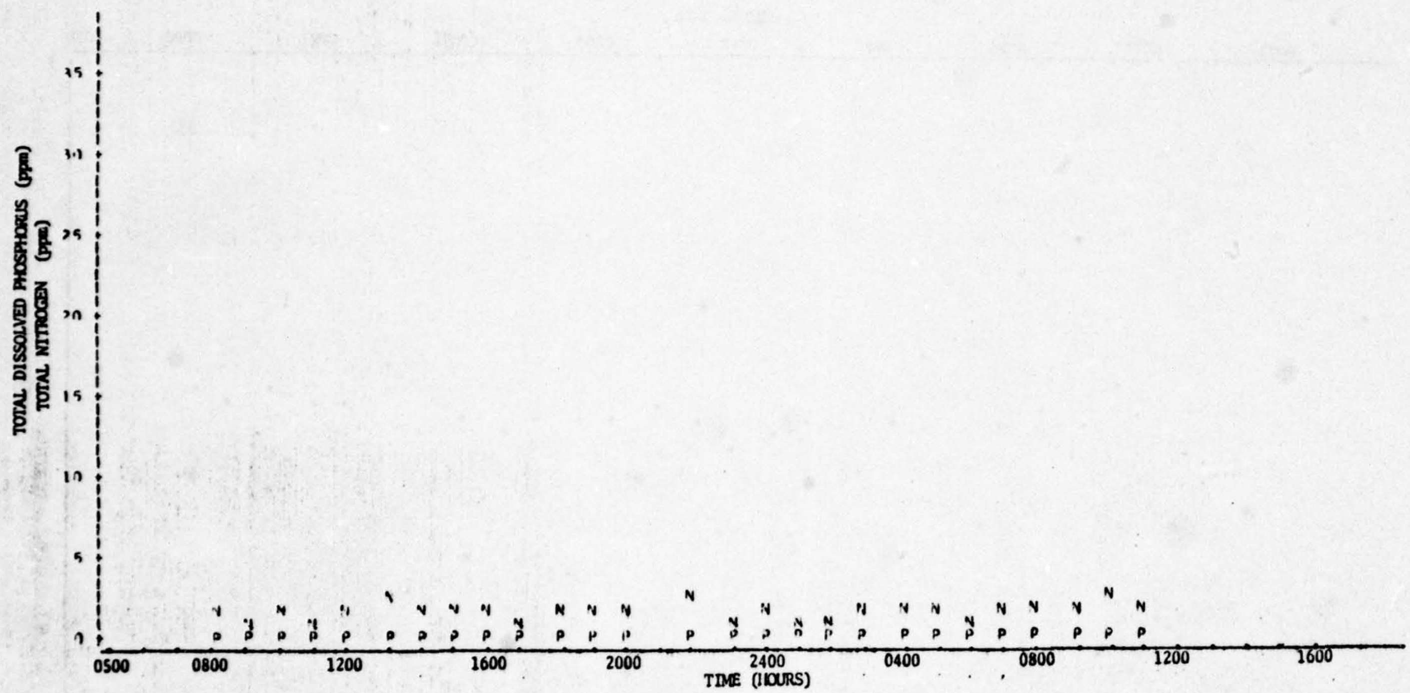
PLOT OF TIME*P LEGEND: SYMBOL USED IS *



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM

6 - 7 October 1976

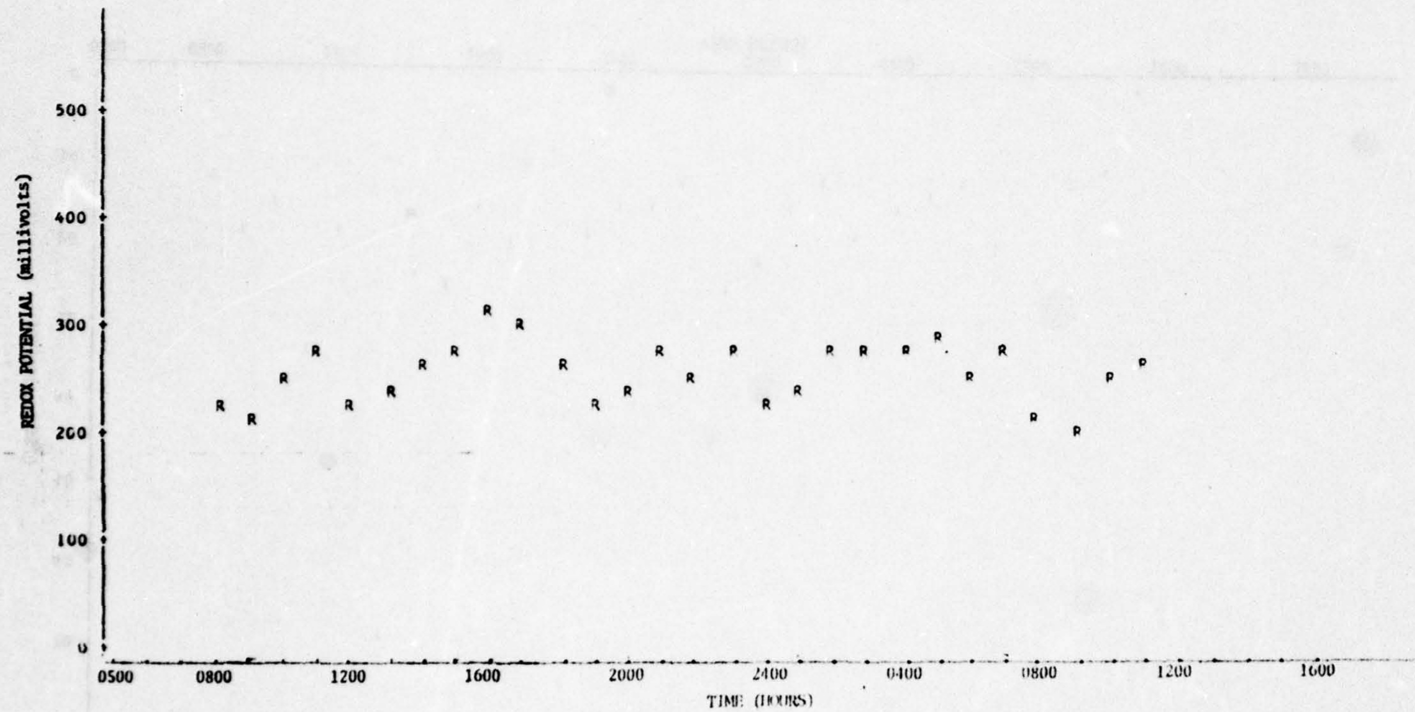
PLOT OF TIME*DPHOS   LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*TNIT   LEGEND: SYMBOL USED IS CHARACTER N



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

6 - 7 October 1976

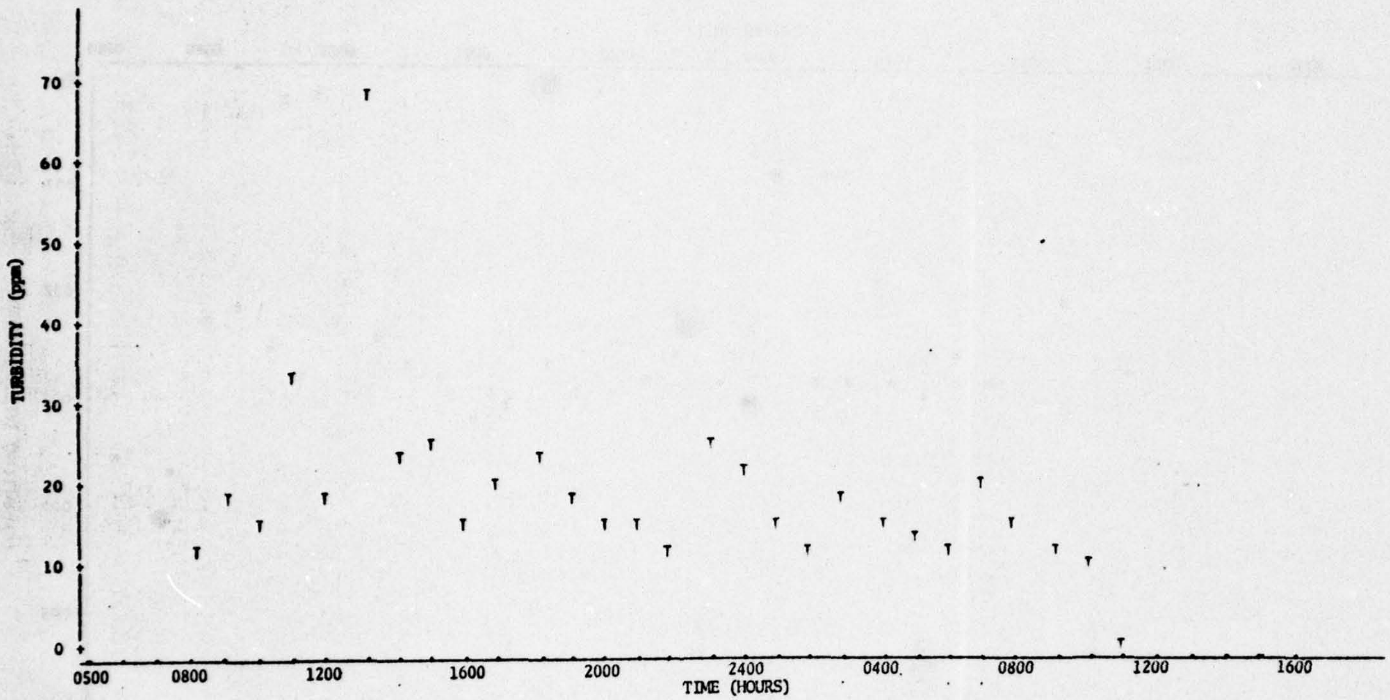
PLOT OF TIME*REDOX LEGEND: SYMBOL USED IS R



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM   78

6 - 7 October 1976

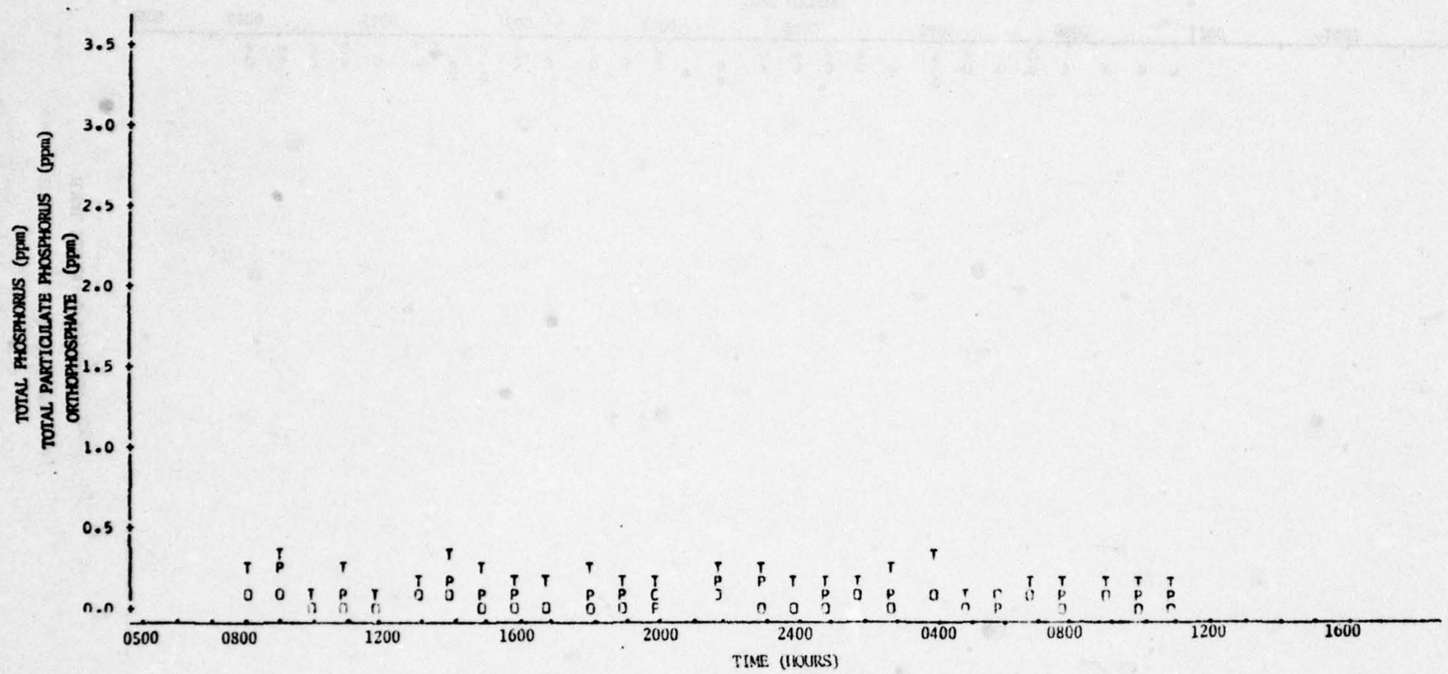
PLOT OF TIME*TURB   LEGEND: SYMBOL USED IS T



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM

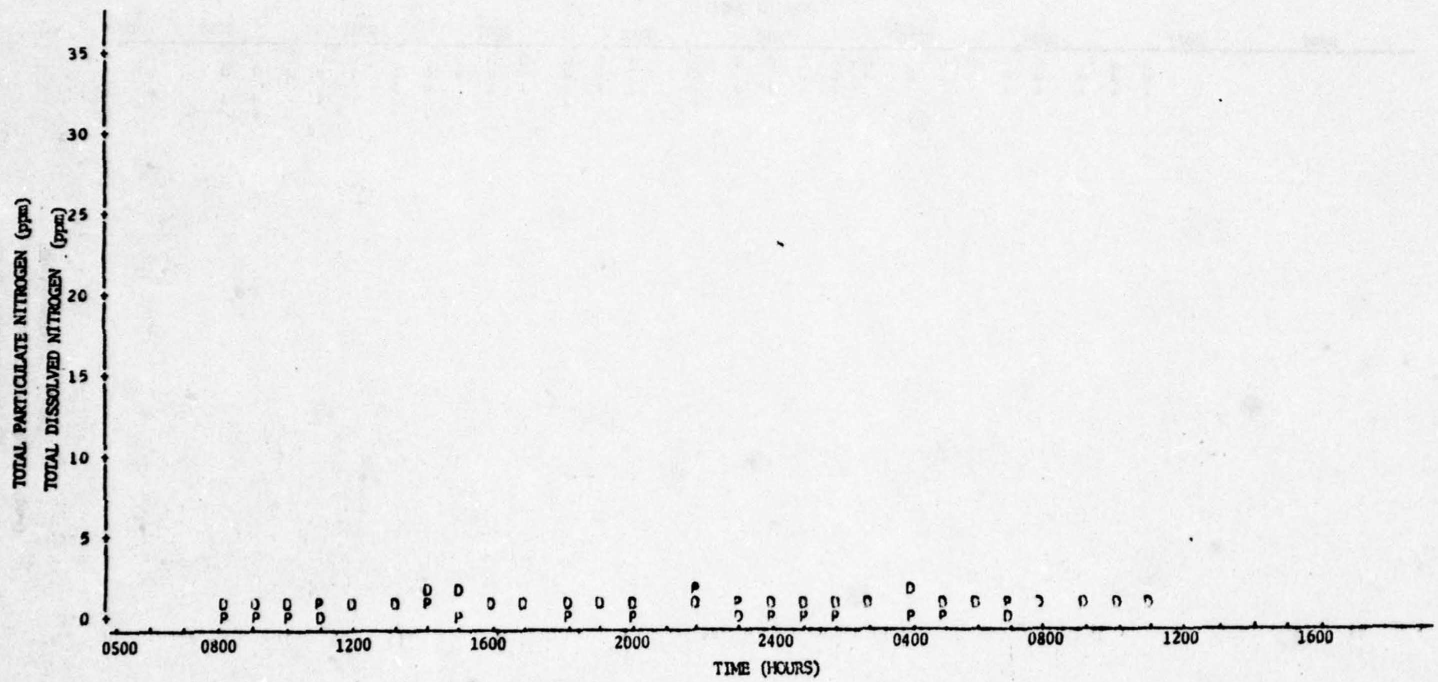
6 - 7 October 1976

PLOT OF TIME*TPHOS   LEGEND: SYMBOL USED IS CHARACTER T
PLOT OF TIME*PPHOS   LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*OPHOS   LEGEND: SYMBOL USED IS CHARACTER O



6 - 7 October 1976

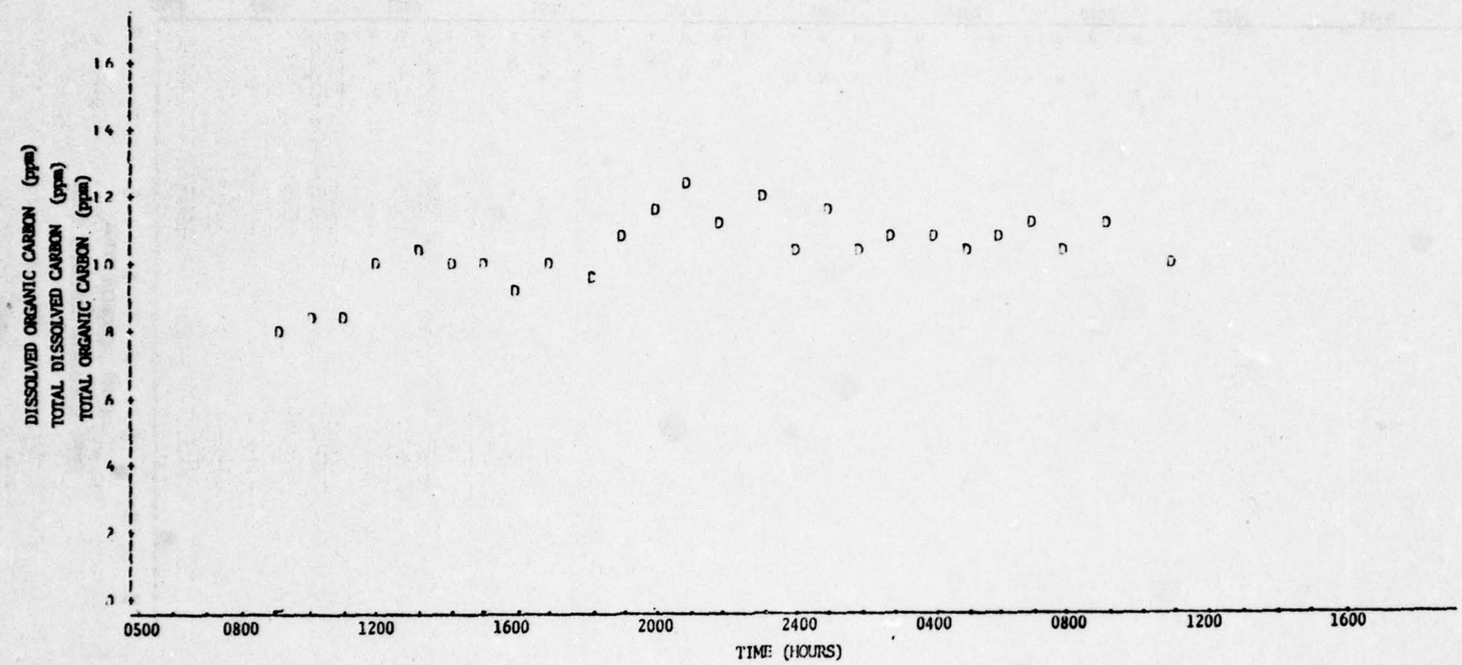
PLOT OF TIME*PNIT   LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*DNIT   LEGEND: SYMBOL USED IS CHARACTER D



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM

1 - 2 December 1976

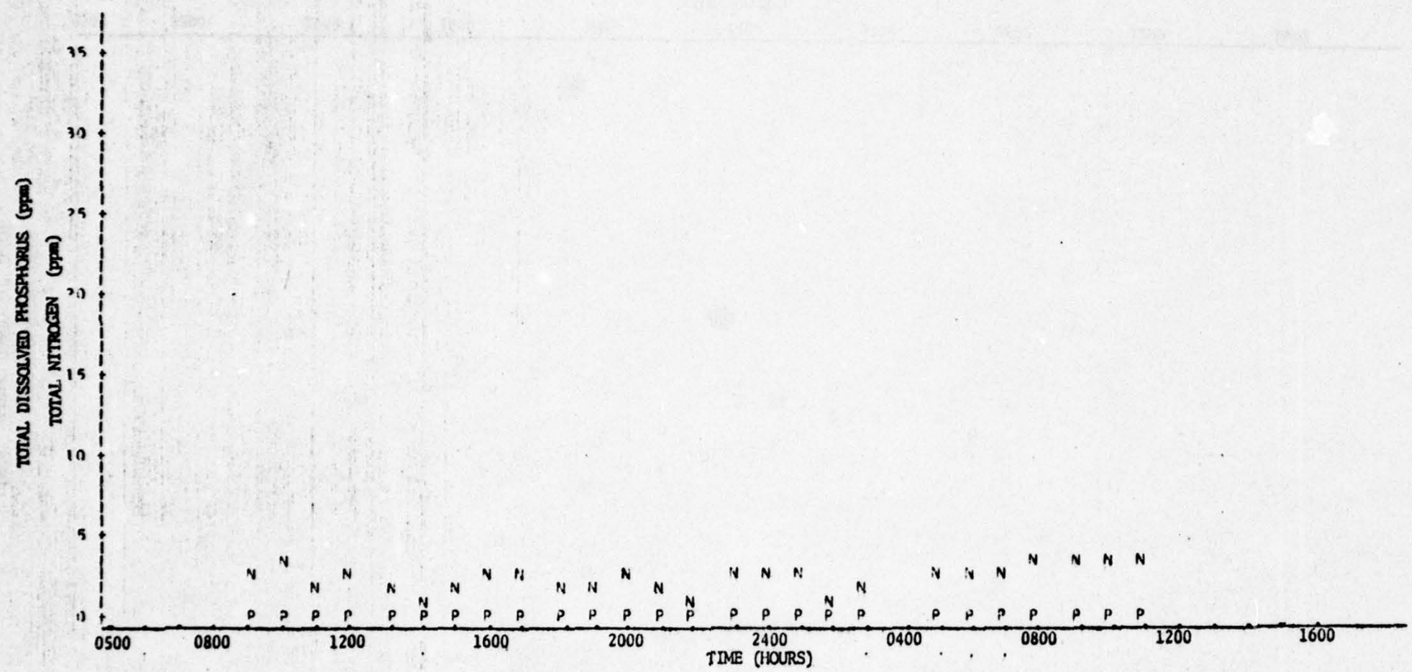
PLOT OF TIME*DOC   LEGEND: SYMBOL USED IS CHARACTER D
PLOT OF TIME*TDC   LEGEND: SYMBOL USED IS CHARACTER T
PLOT OF TIME*TOC   LEGEND: SYMBOL USED IS CHARACTER O



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

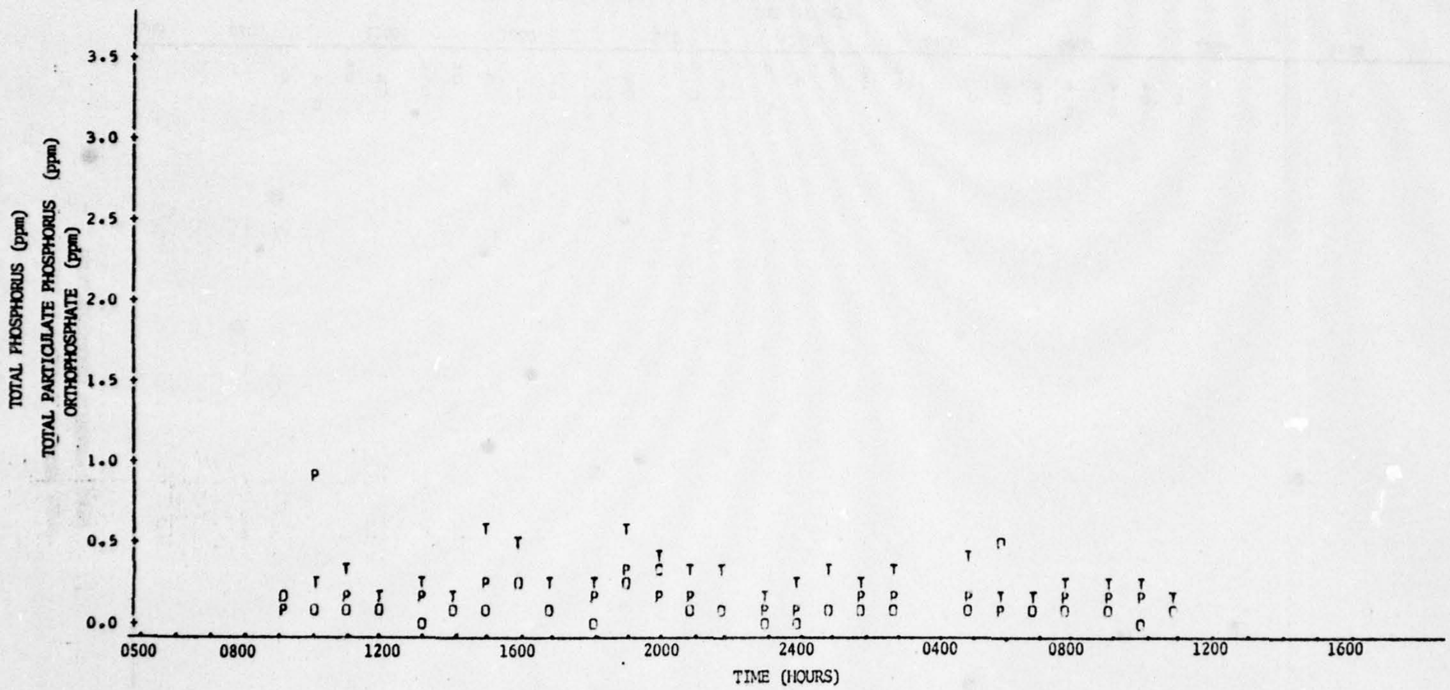
1 - 2 December 1976

PLOT OF TIME*OPHOS LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*TNIT LEGEND: SYMBOL USED IS CHARACTER N



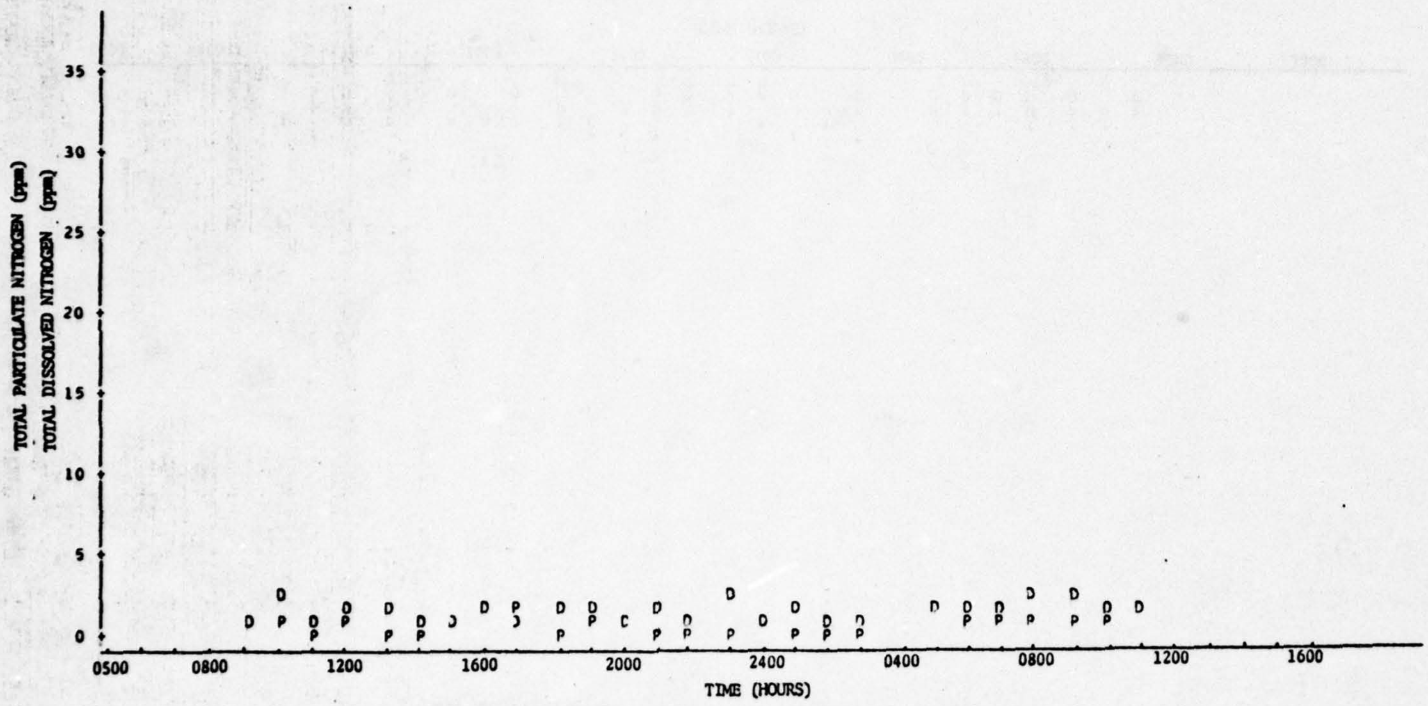
1 - 2 December 1976

PLOT OF TIME*TPHOS LEGEND: SYMBOL USED IS CHARACTER T
PLOT OF TIME*PPHOS LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*OPHOS LEGEND: SYMBOL USED IS CHARACTER O



1 - 2 December 1976

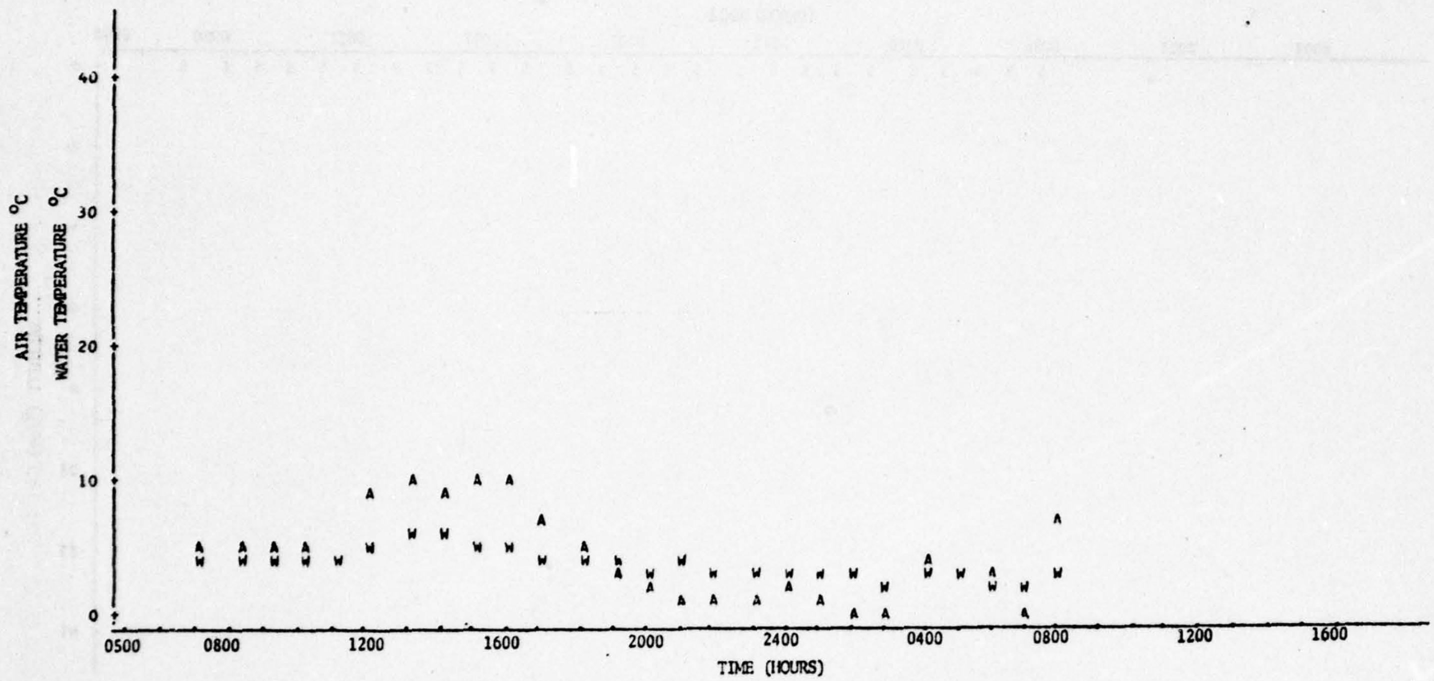
PLOT OF TIME*PNIT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*DNIT LEGEND: SYMBOL USED IS CHARACTER D



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

25 - 26 January 1977

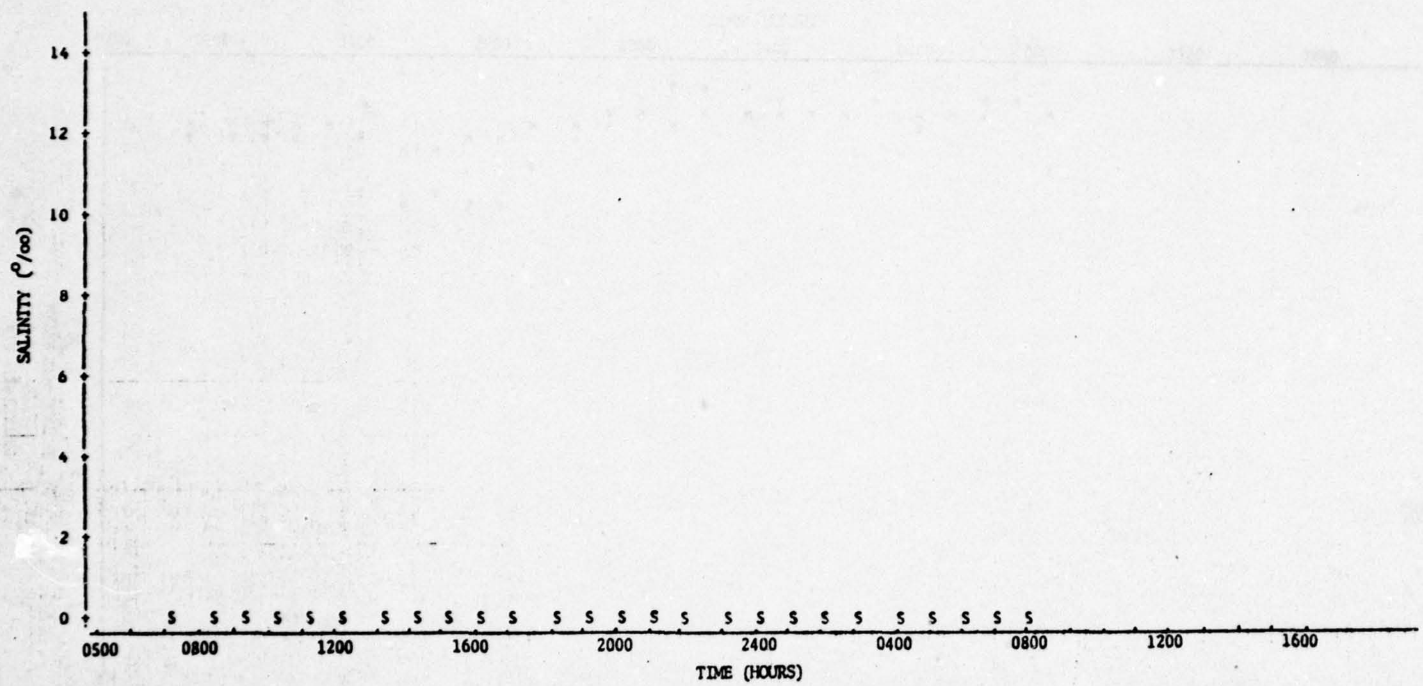
PLOT OF TIME*AIR_T LEGEND: SYMBOL USED IS CHARACTER A
PLOT OF TIME*WAT_T LEGEND: SYMBOL USED IS CHARACTER W



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM

25 - 26 January 1977

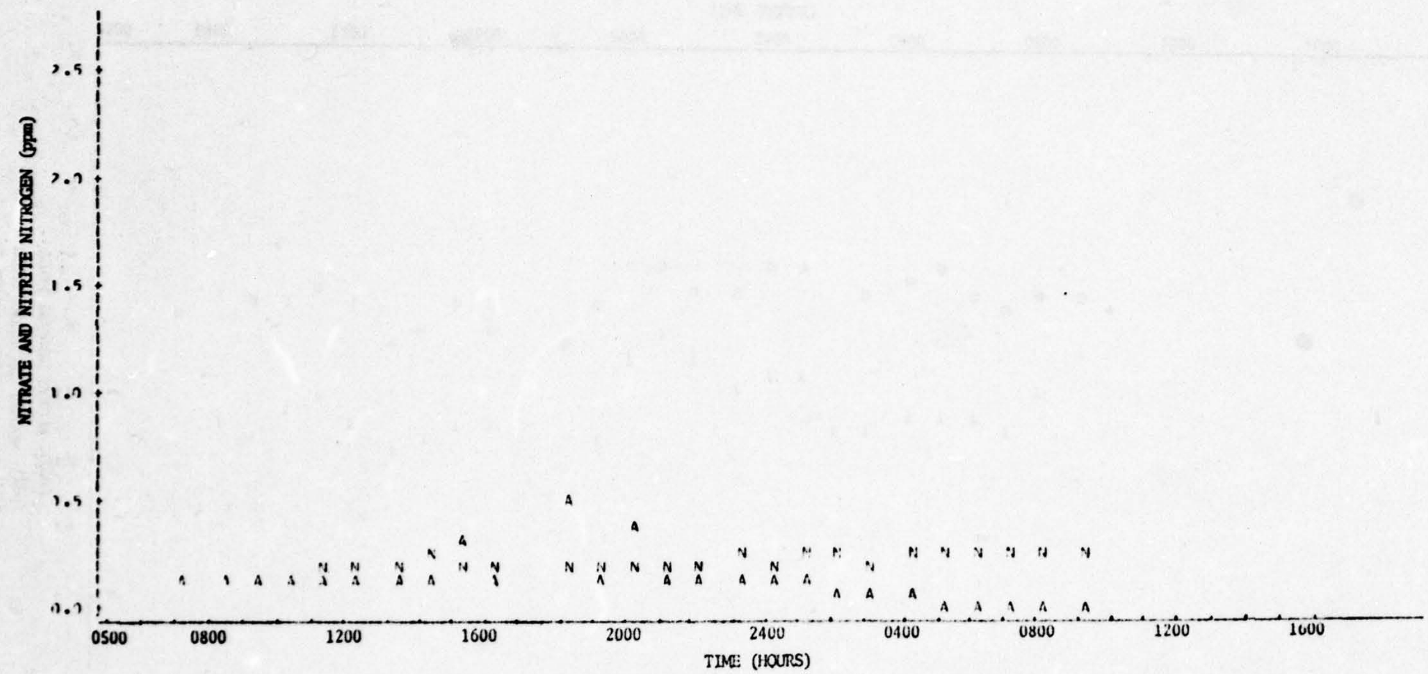
PLOT OF TIME*SAL   LEGEND: SYMBOL USED IS S



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM 25

25 - 26 January 1977

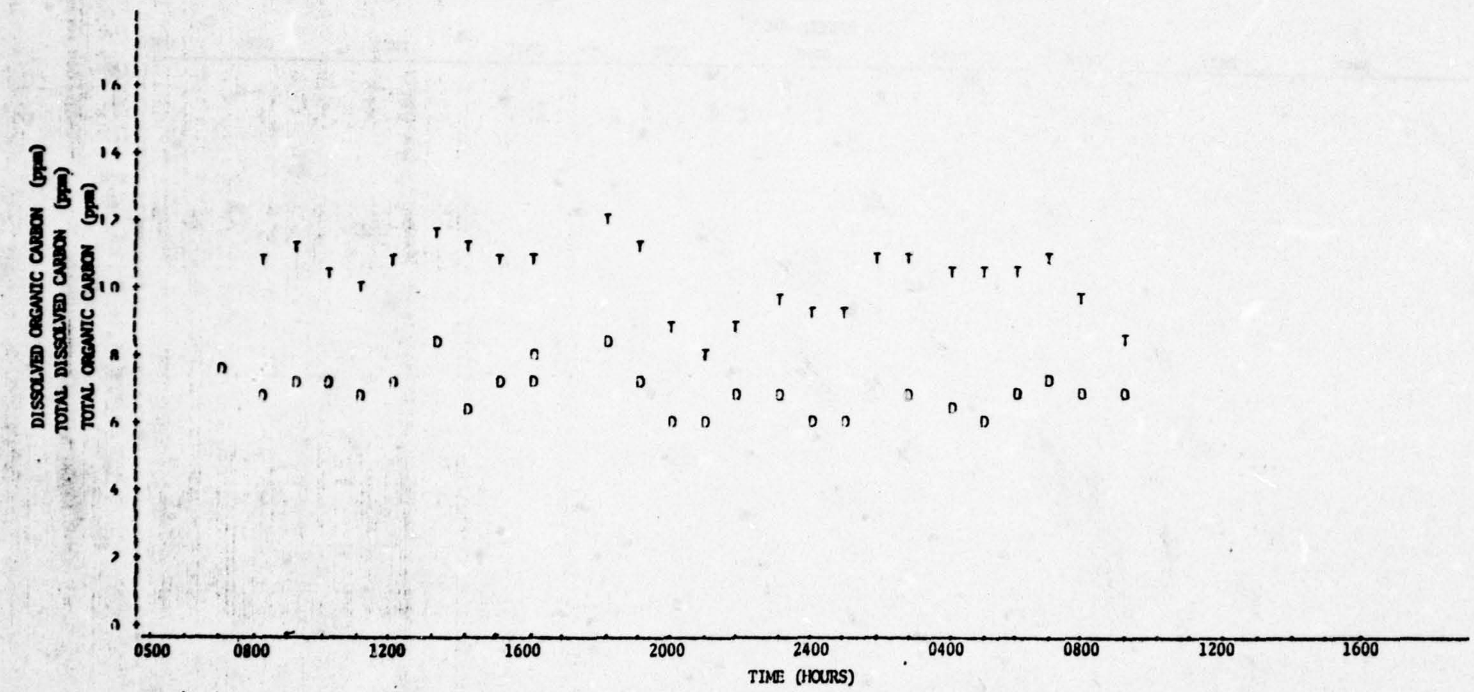
PLOT OF TIME*NITA LEGEND: SYMBOL USED IS CHARACTER N
PLOT OF TIME*AMMO LEGEND: SYMBOL USED IS CHARACTER A



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

25 - 26 January 1977

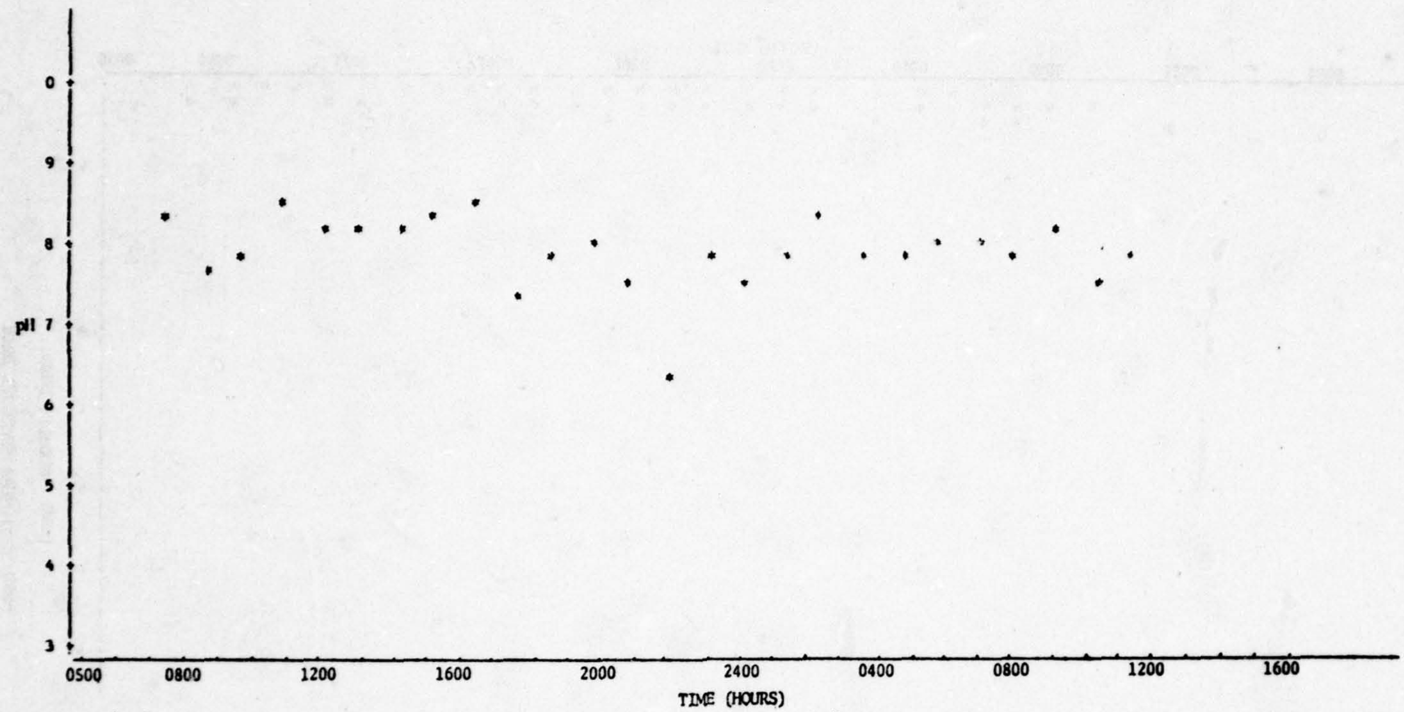
PLOT OF TIME*DOC LEGEND: SYMBOL USED IS CHARACTER D
PLOT OF TIME*TDC LEGEND: SYMBOL USED IS CHARACTER T
PLOT OF TIME*TOC LEGEND: SYMBOL USED IS CHARACTER D



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM   46

25 - 26 January 1977

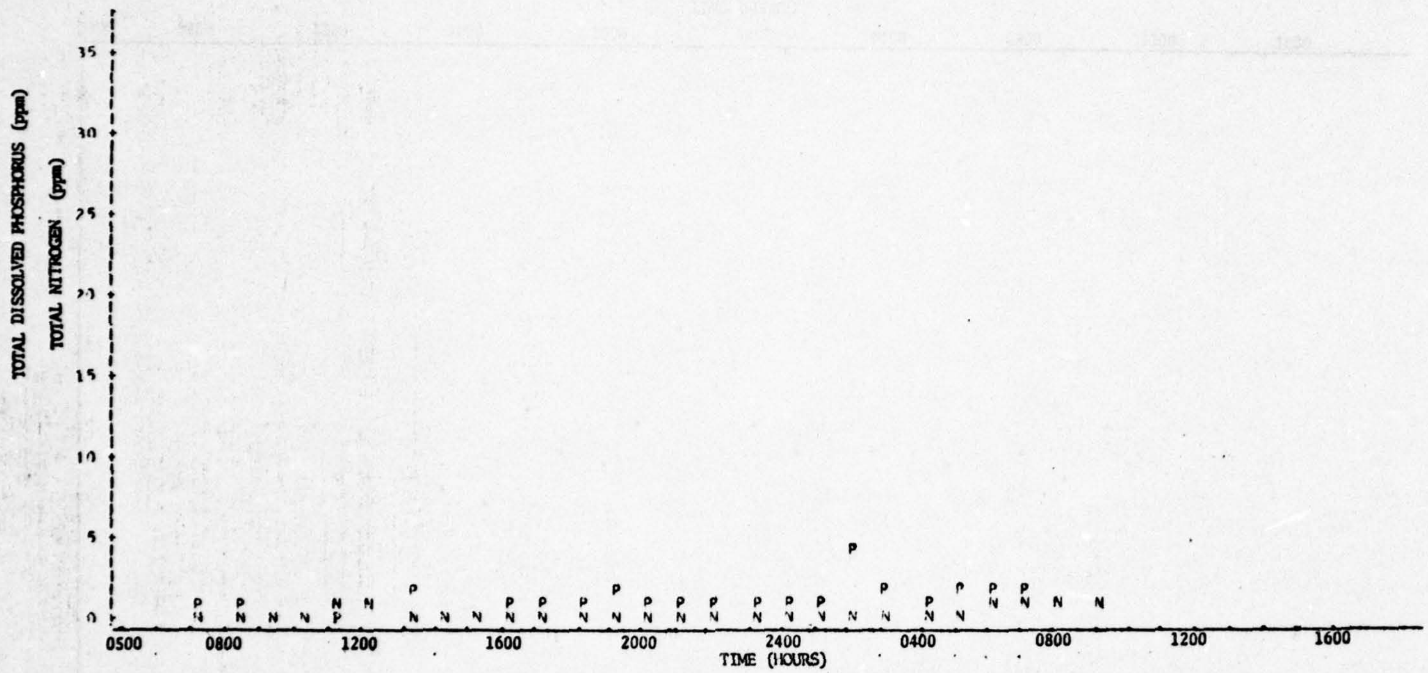
PLOT OF TIME*P   LEGEND: SYMBOL USED IS *



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM   49

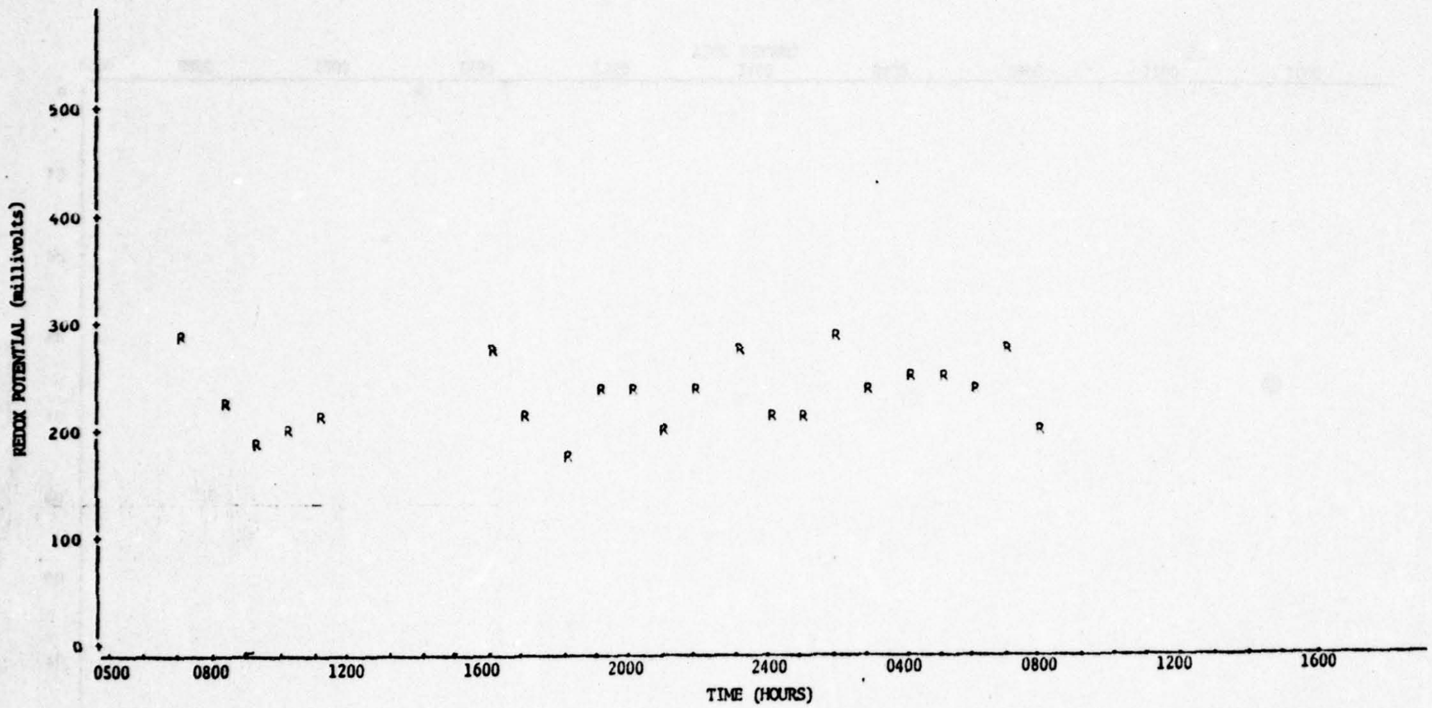
25 - 26 January 1977

PLOT OF TIME*OPHOS   LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*TNIT   LEGEND: SYMBOL USED IS CHARACTER N



25 - 26 January 1977

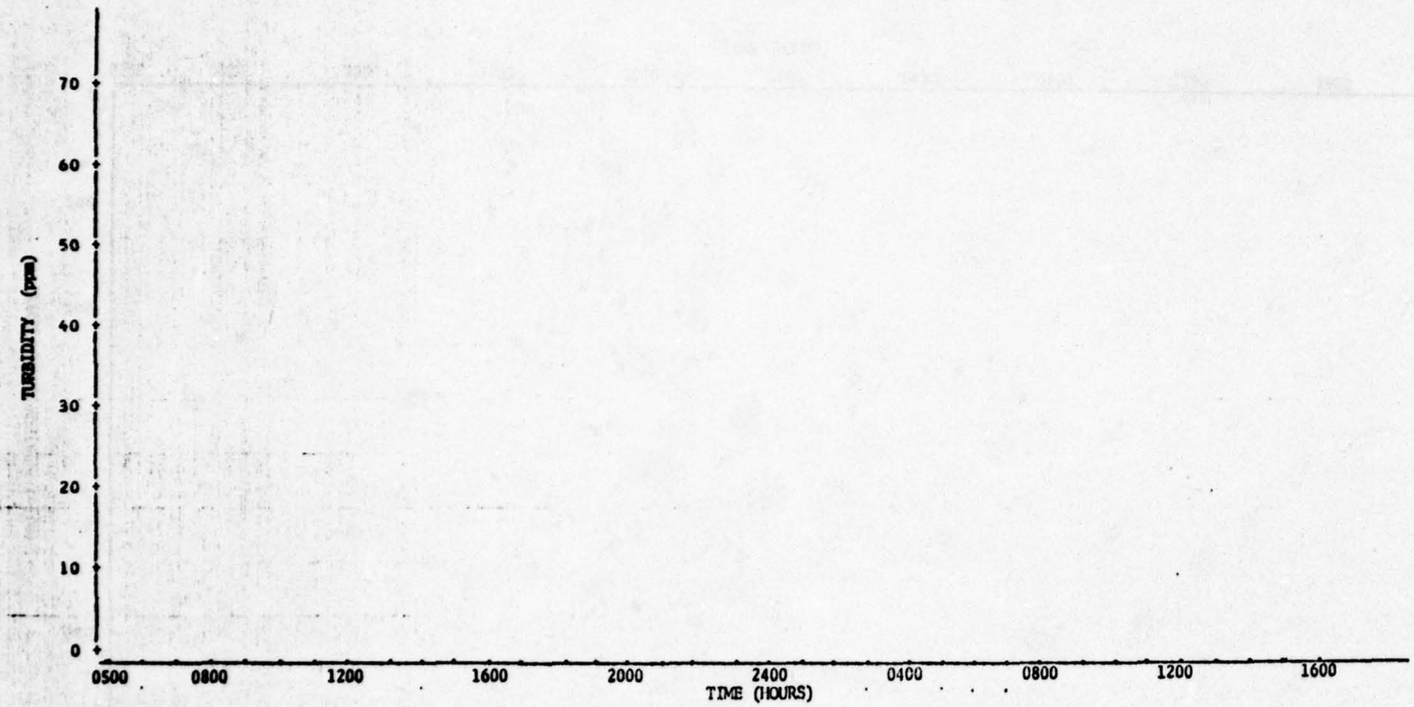
PLOT OF TIME*REDOX LEGEND: SYMBOL USED IS R



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM

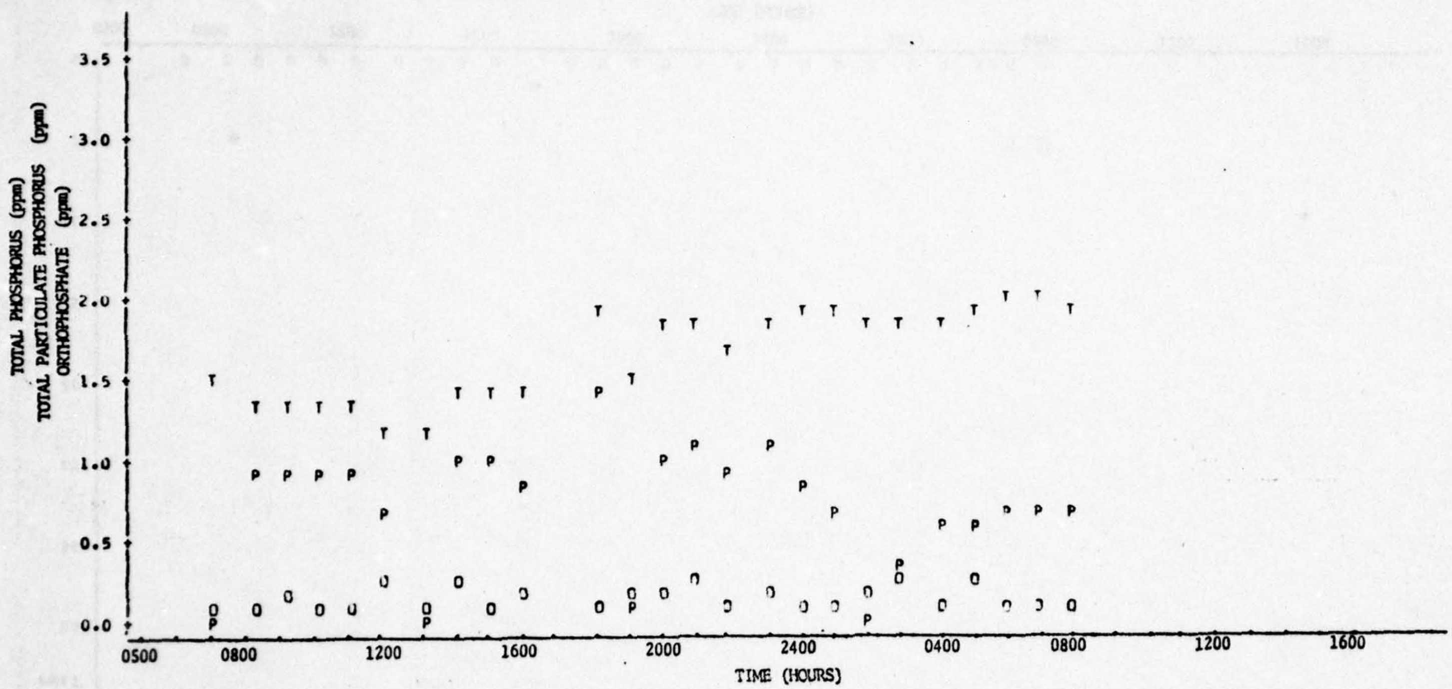
25 - 26 January 1977

PLOT OF TIME*TURB   LEGEND: SYMBOL USED IS T



25 - 26 January 1977

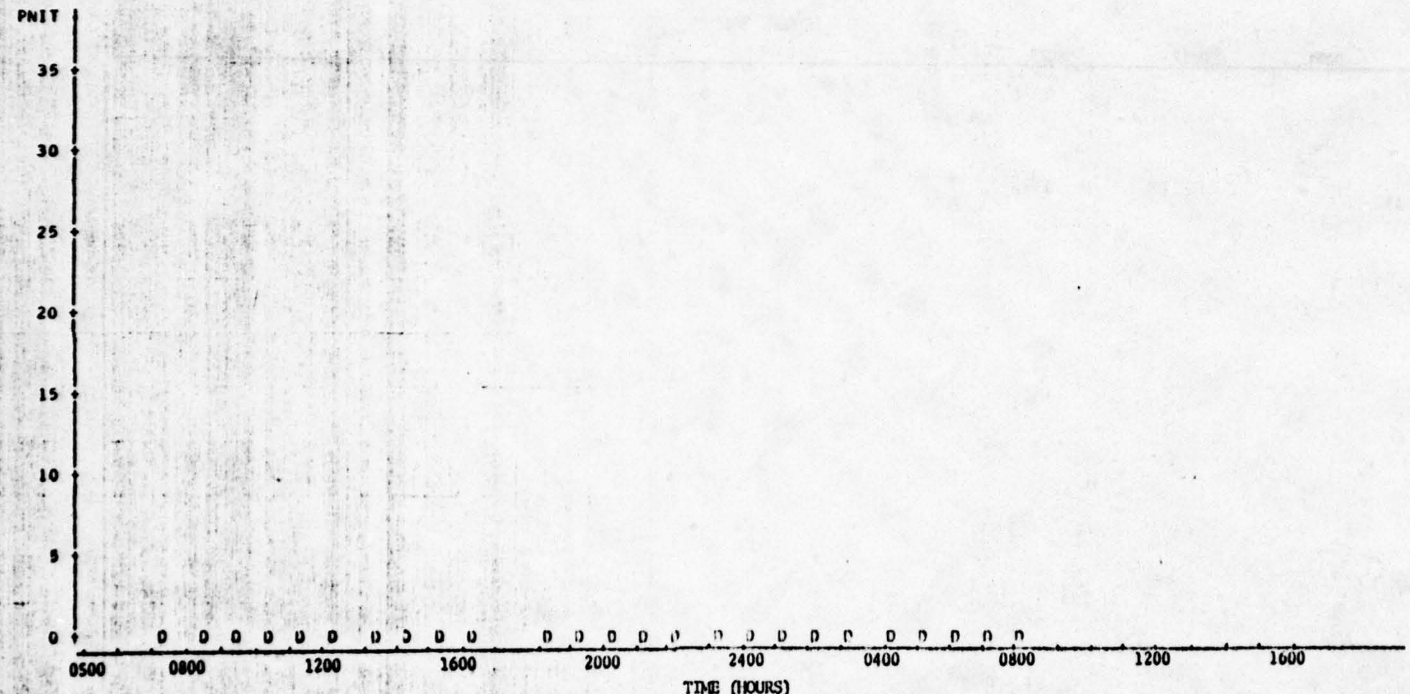
PLOT OF TIME*TPHOS   LEGEND: SYMBOL USED IS CHARACTER T
PLOT OF TIME*PPHOS   LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*OPHOS   LEGEND: SYMBOL USED IS CHARACTER O



A163

25 - 26 January 1977

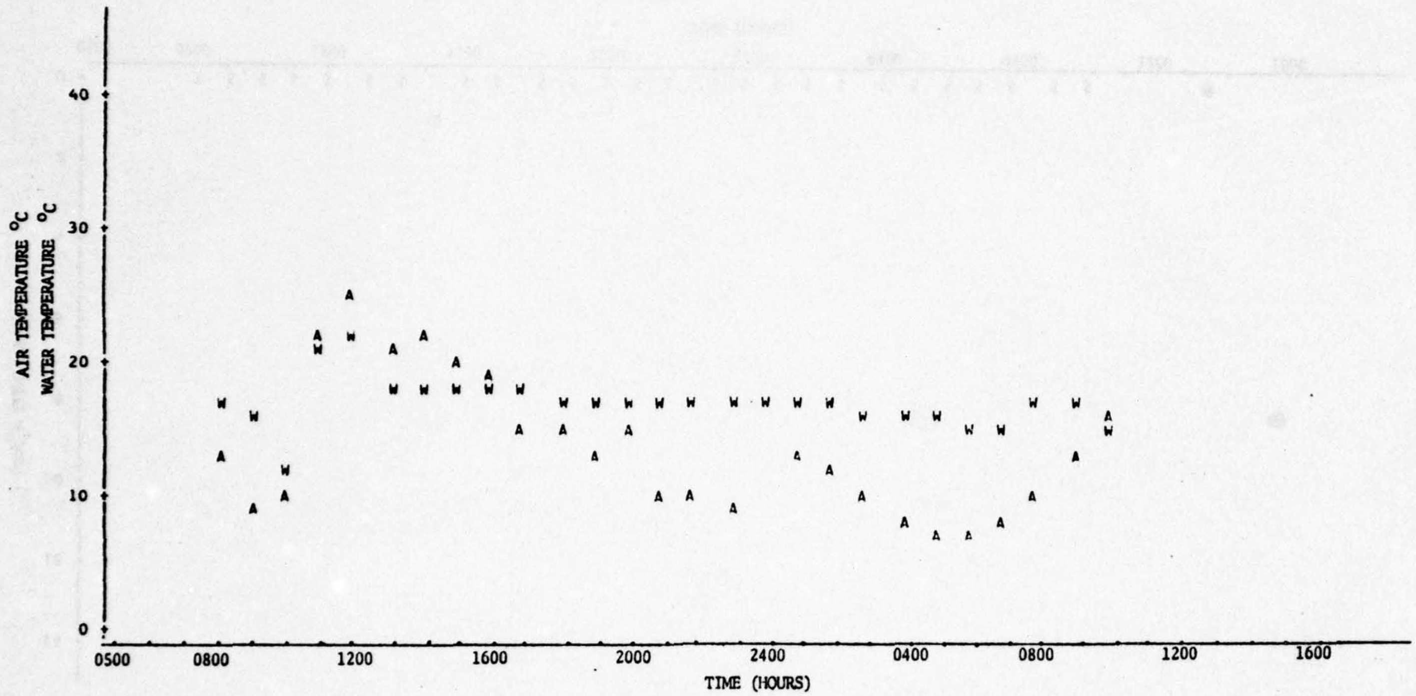
PLOT OF TIME*PNIT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*DNIT LEGEND: SYMBOL USED IS CHARACTER D



A164

23 - 24 March 1977

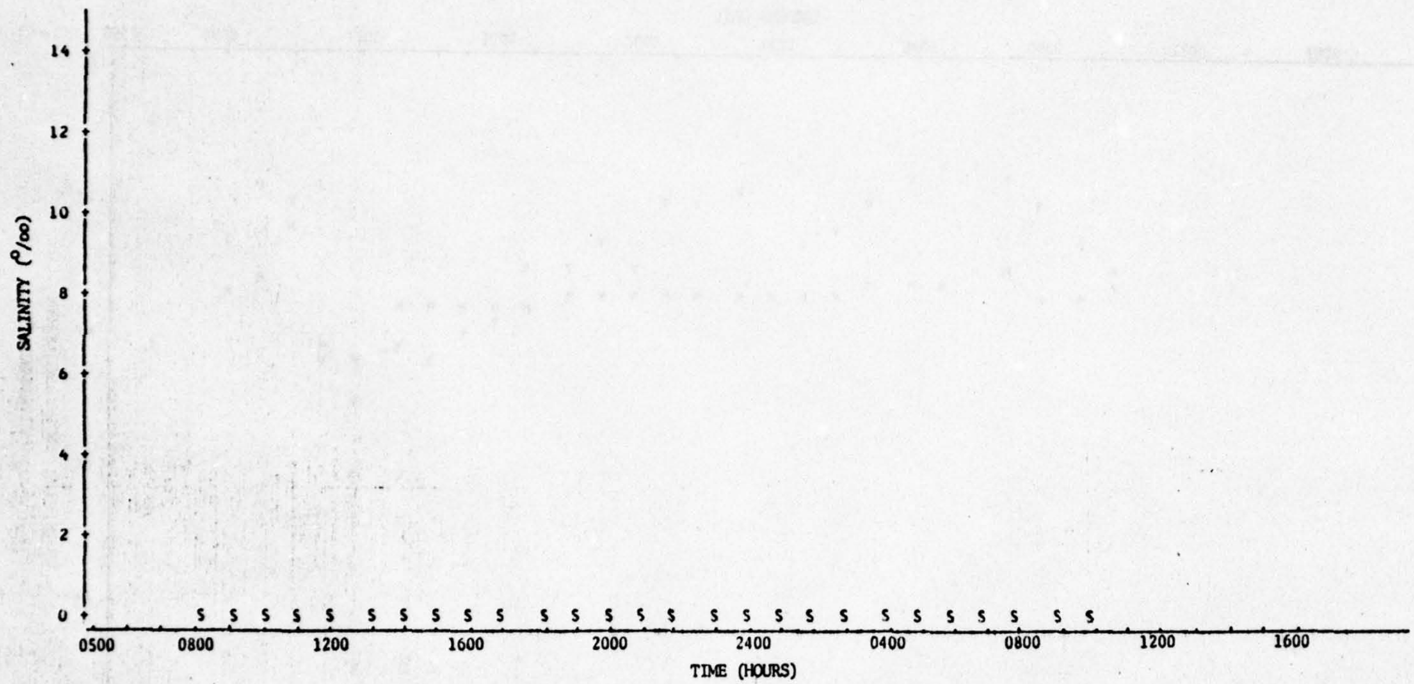
PLOT OF TIME*AIR_T LEGEND: SYMBOL USED IS CHARACTER A
PLOT OF TIME*WAT_T LEGEND: SYMBOL USED IS CHARACTER W



A165

23 - 24 March 1977

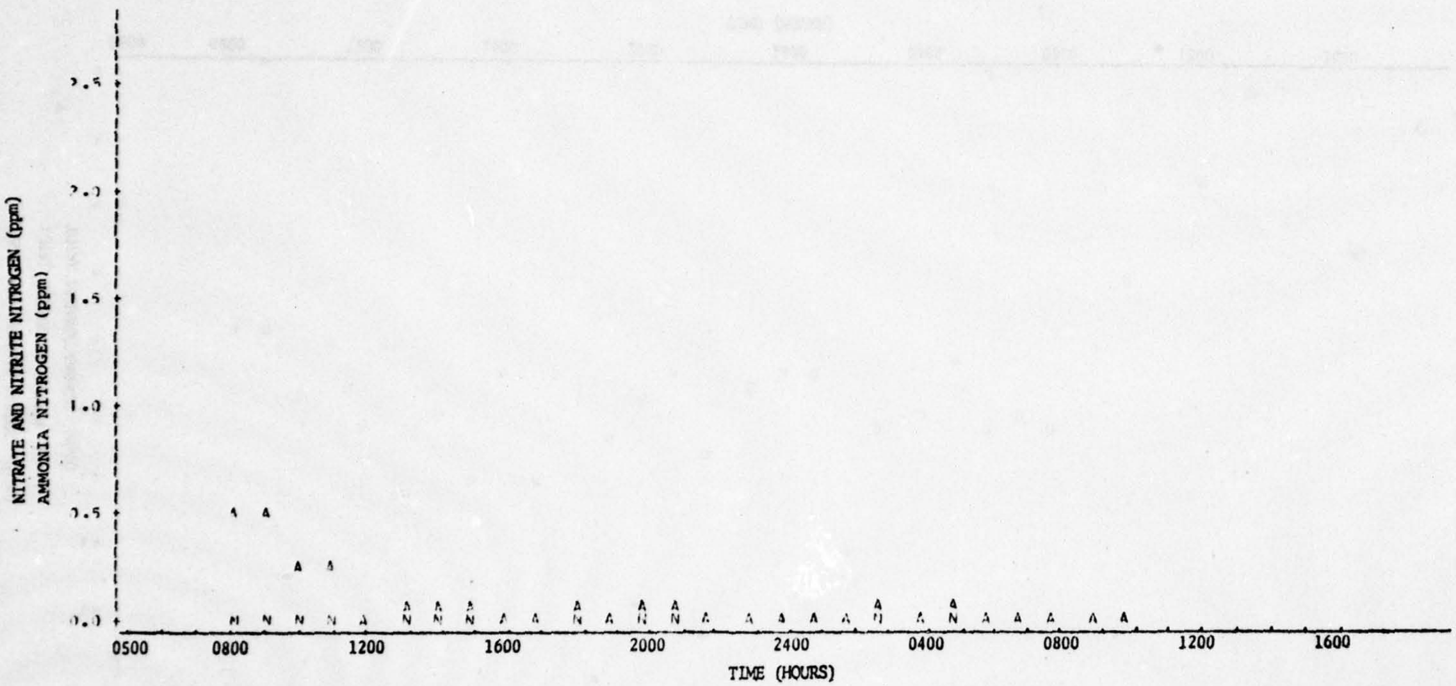
PLOT OF TIME*SAL LEGEND: SYMBOL USED IS S



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

23 - 24 March 1977

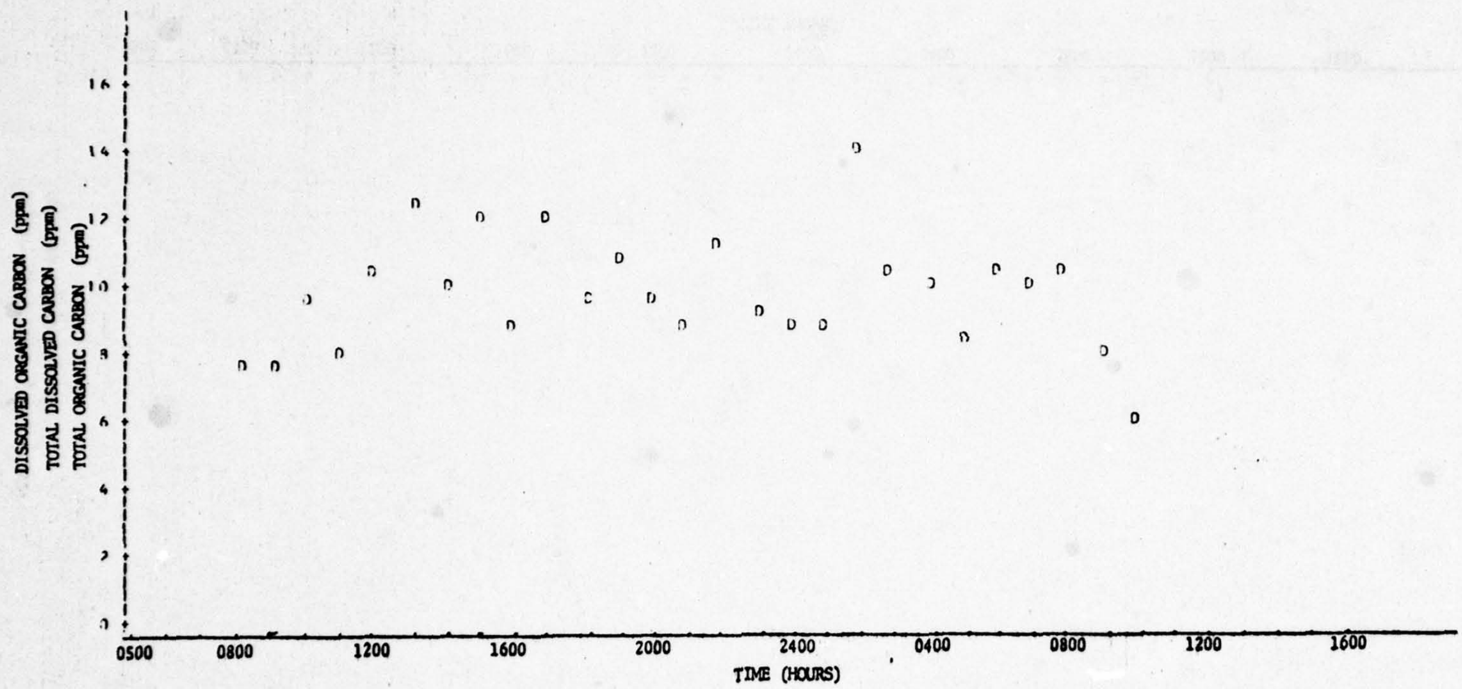
PLOT OF TIME*NITA LEGEND: SYMBOL USED IS CHARACTER N
PLOT OF TIME*AMMO LEGEND: SYMBOL USED IS CHARACTER A



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM 28

23 - 24 March 1977

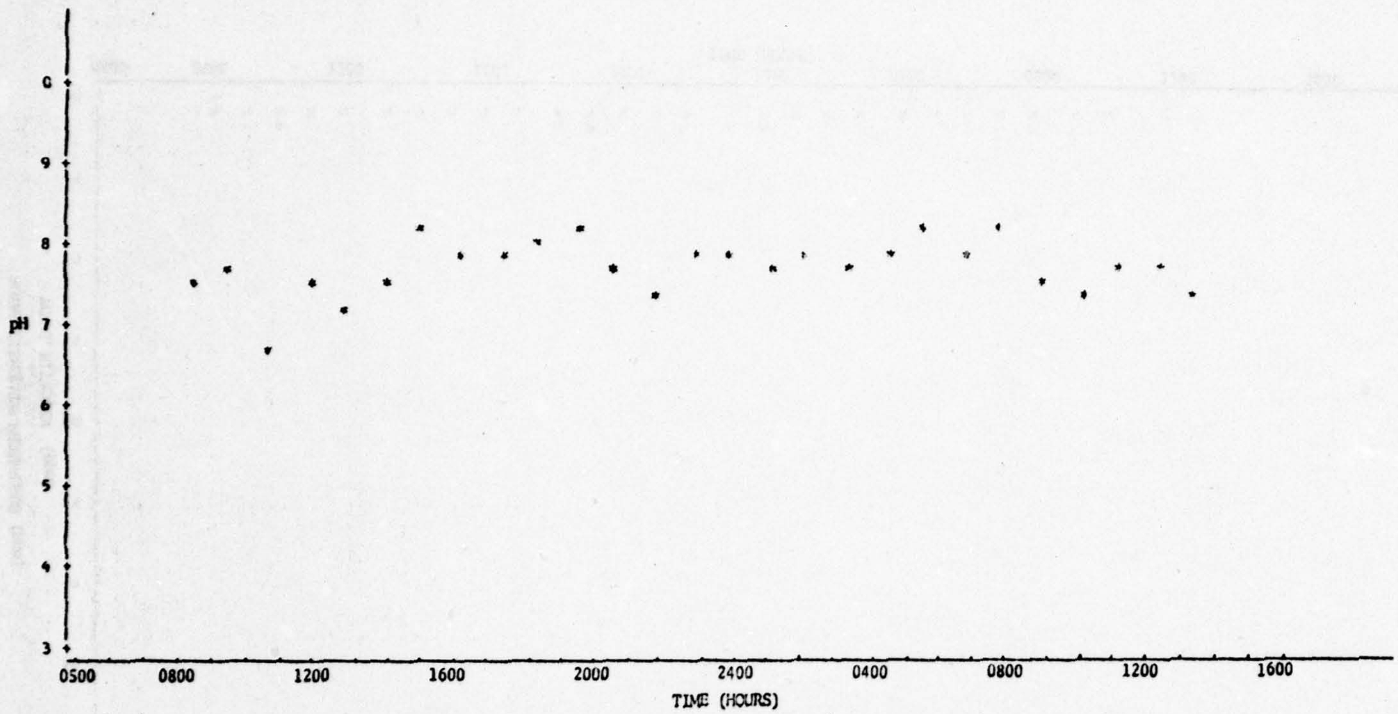
PLOT OF TIME*DOC LEGEND: SYMBOL USED IS CHARACTER D
PLOT OF TIME*TDC LEGEND: SYMBOL USED IS CHARACTER T
PLOT OF TIME*TOC LEGEND: SYMBOL USED IS CHARACTER O



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM   47

23 - 24 March 1977

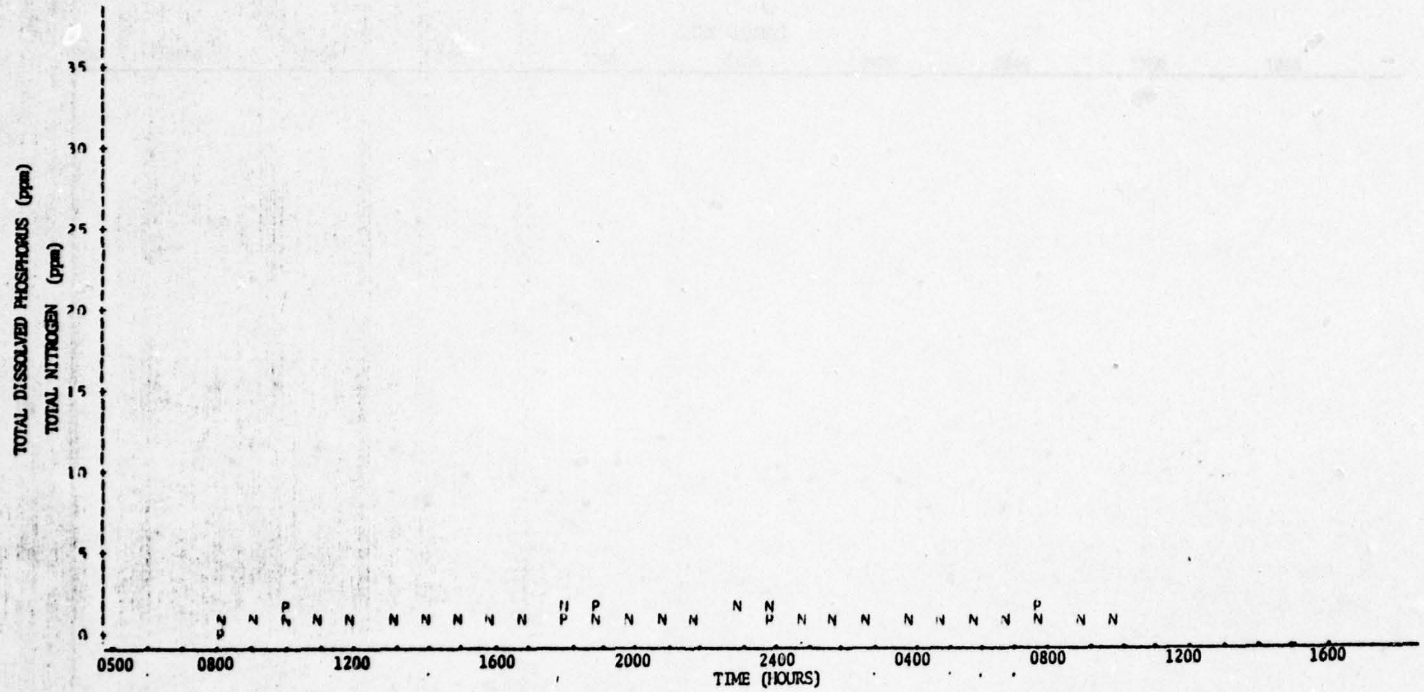
PLOT OF TIME*P   LEGEND: SYMBOL USED IS *



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM

23 - 24 March 1977

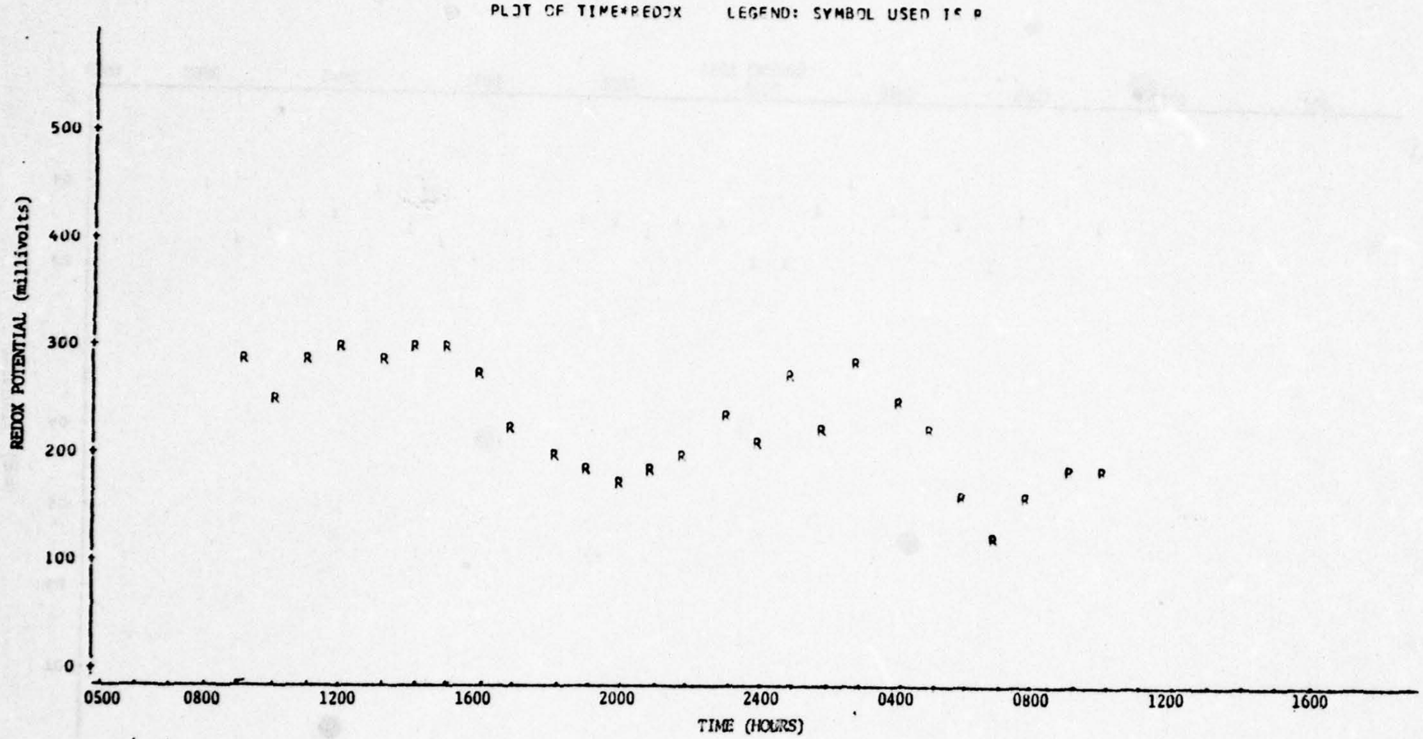
PLOT OF TIME*DPHOS   LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*TNIT   LEGEND: SYMBOL USED IS CHARACTER N



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

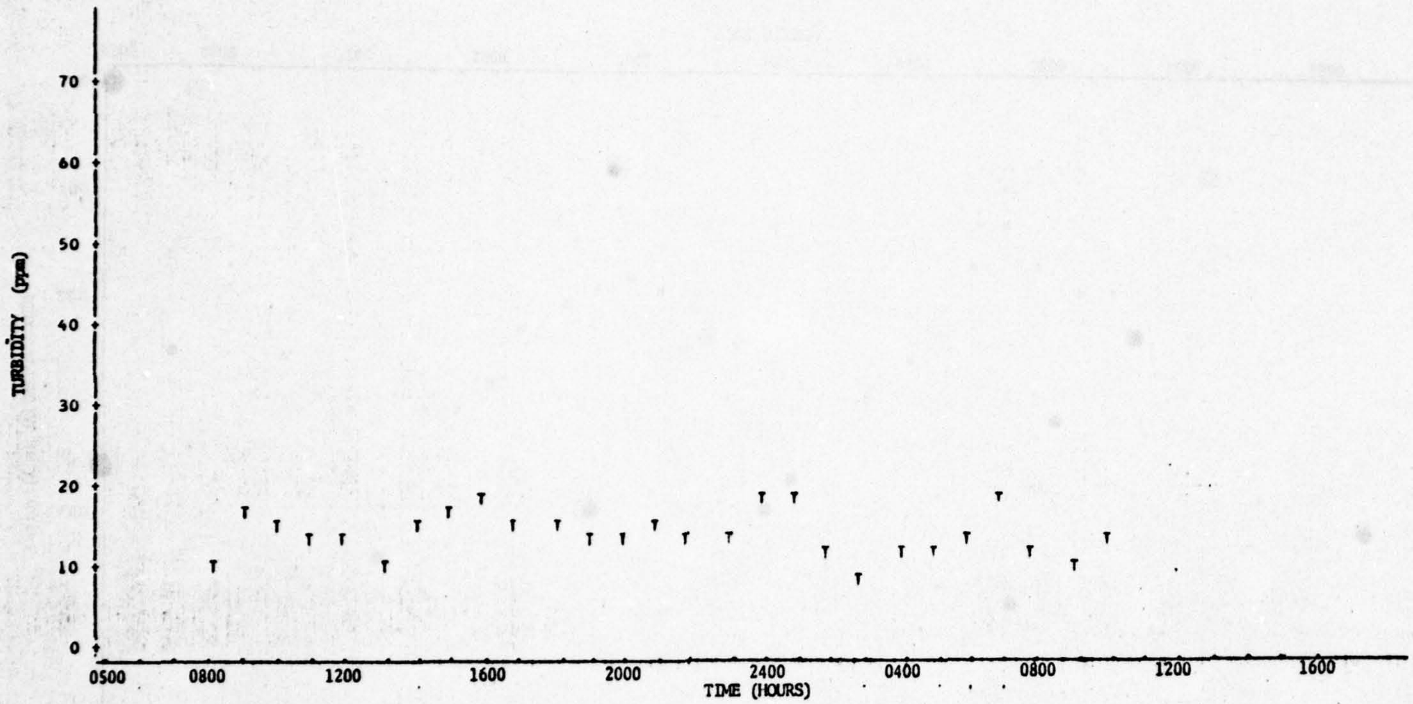
23 - 24 March 1977

PLOT OF TIME*REDOX LEGEND: SYMBOL USED IS R



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM
23 - 24 March 1977

PLOT OF TIME*TURB LEGEND: SYMBOL USED IS T

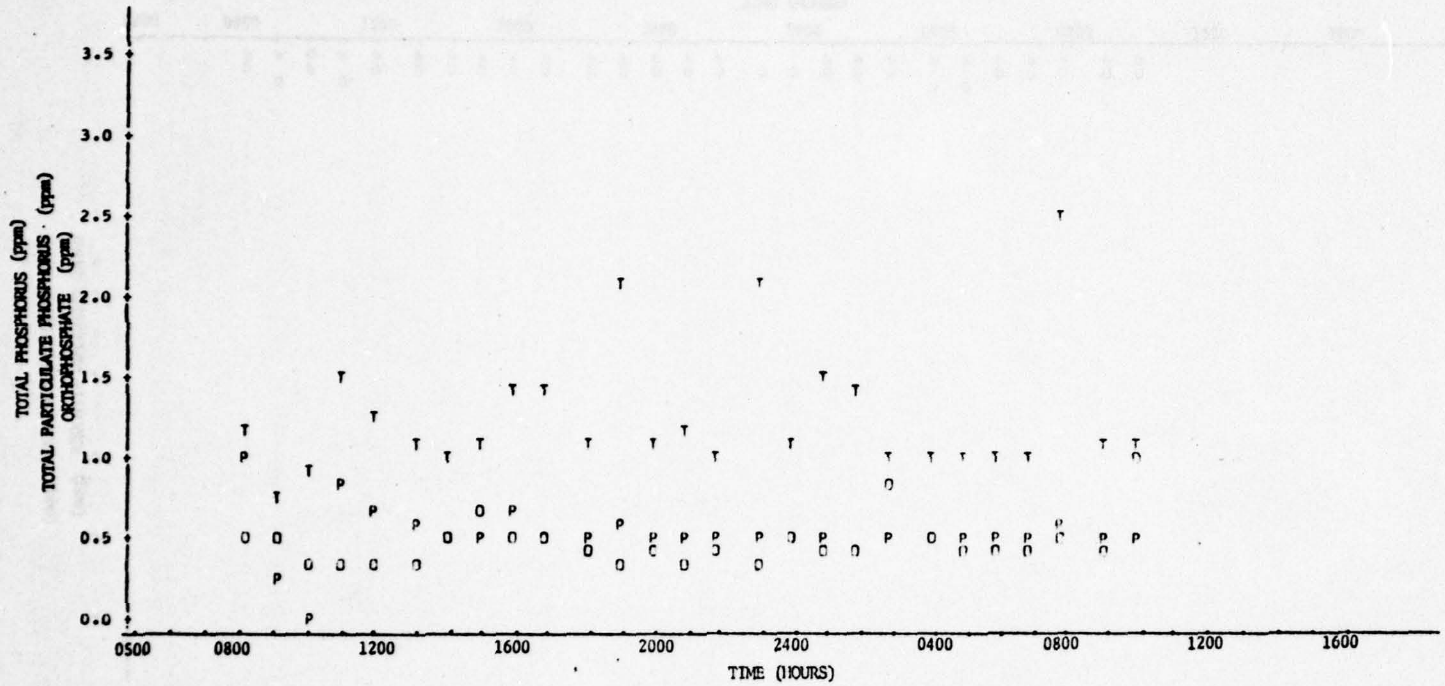


A172

PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

23 - 24 March 1977

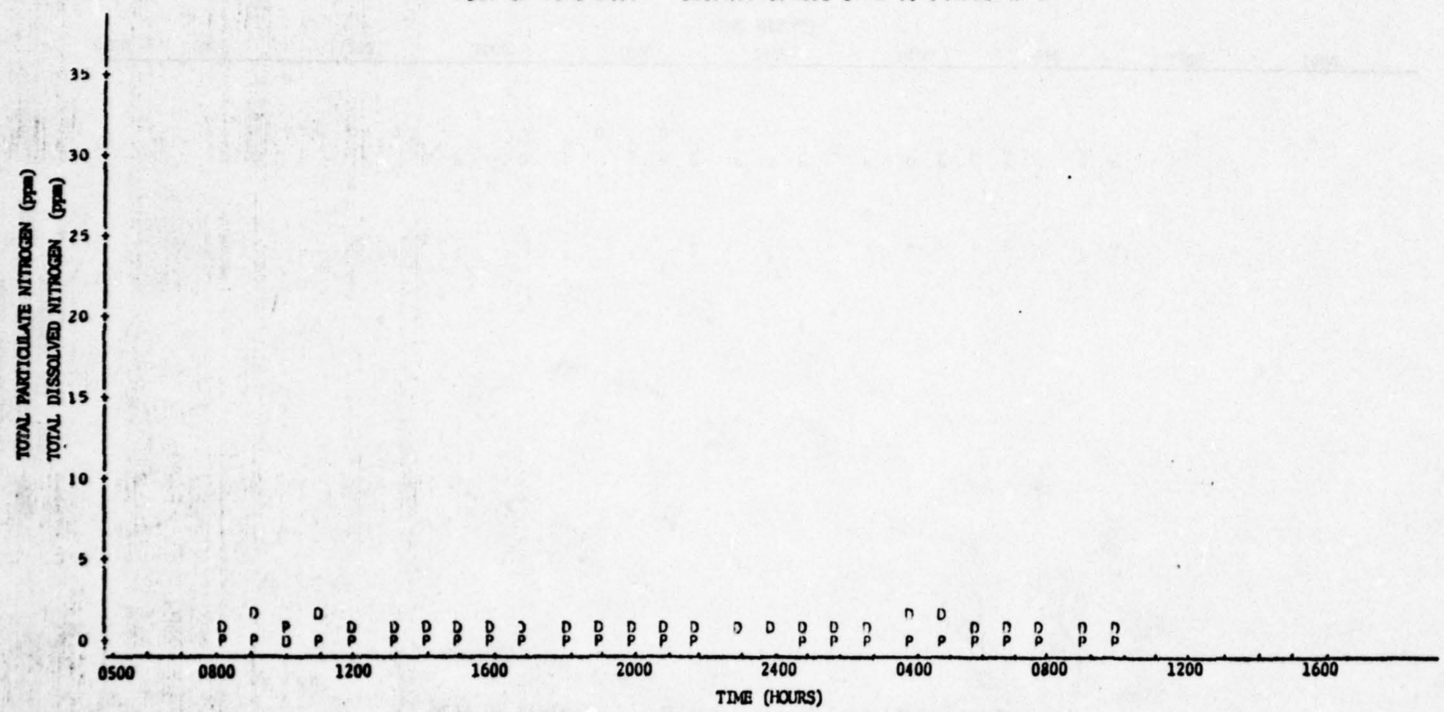
PLOT OF TIME*TPHOS LEGEND: SYMBOL USED IS CHARACTER T
PLOT OF TIME*PPHOS LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*OPHOS LEGEND: SYMBOL USED IS CHARACTER O



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM   115

23 - 24 March 1977

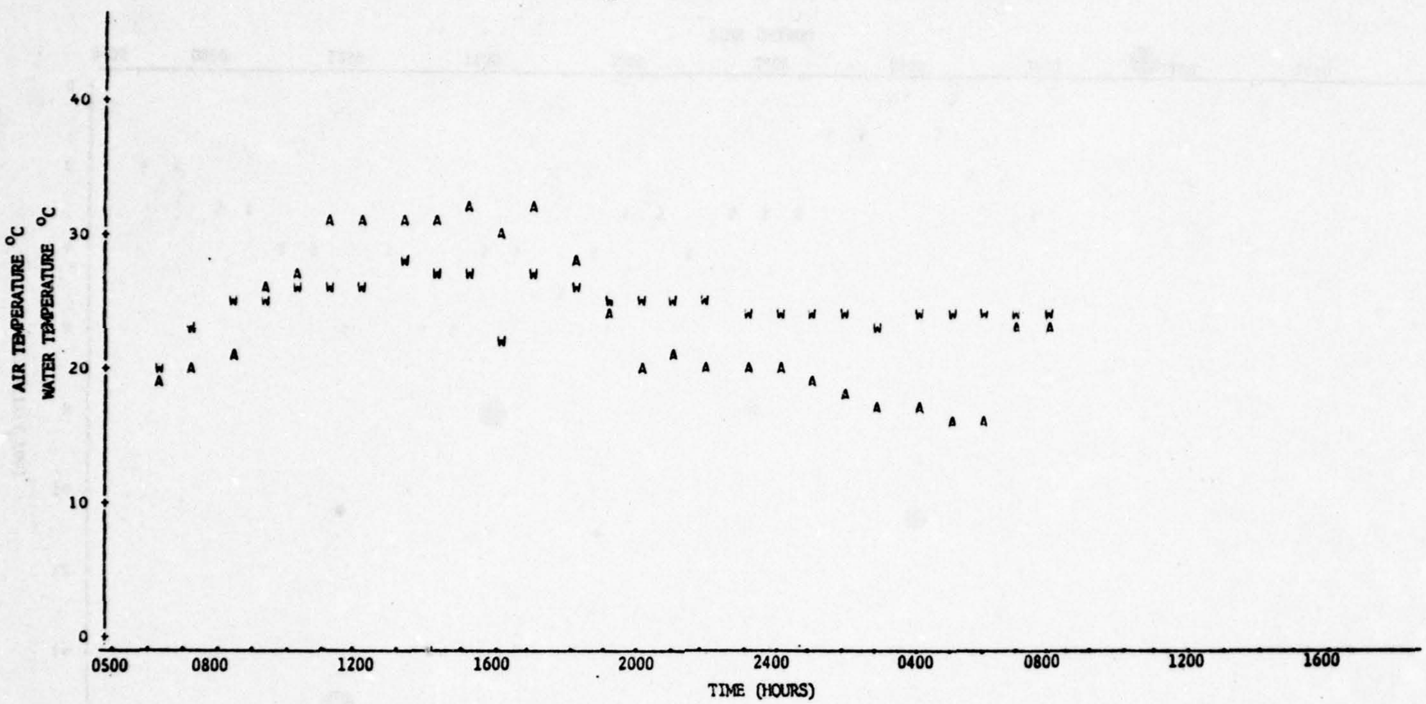
PLOT OF TIME*PNIT   LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*DNIT   LEGEND: SYMBOL USED IS CHARACTER D



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

18 - 19 May 1977

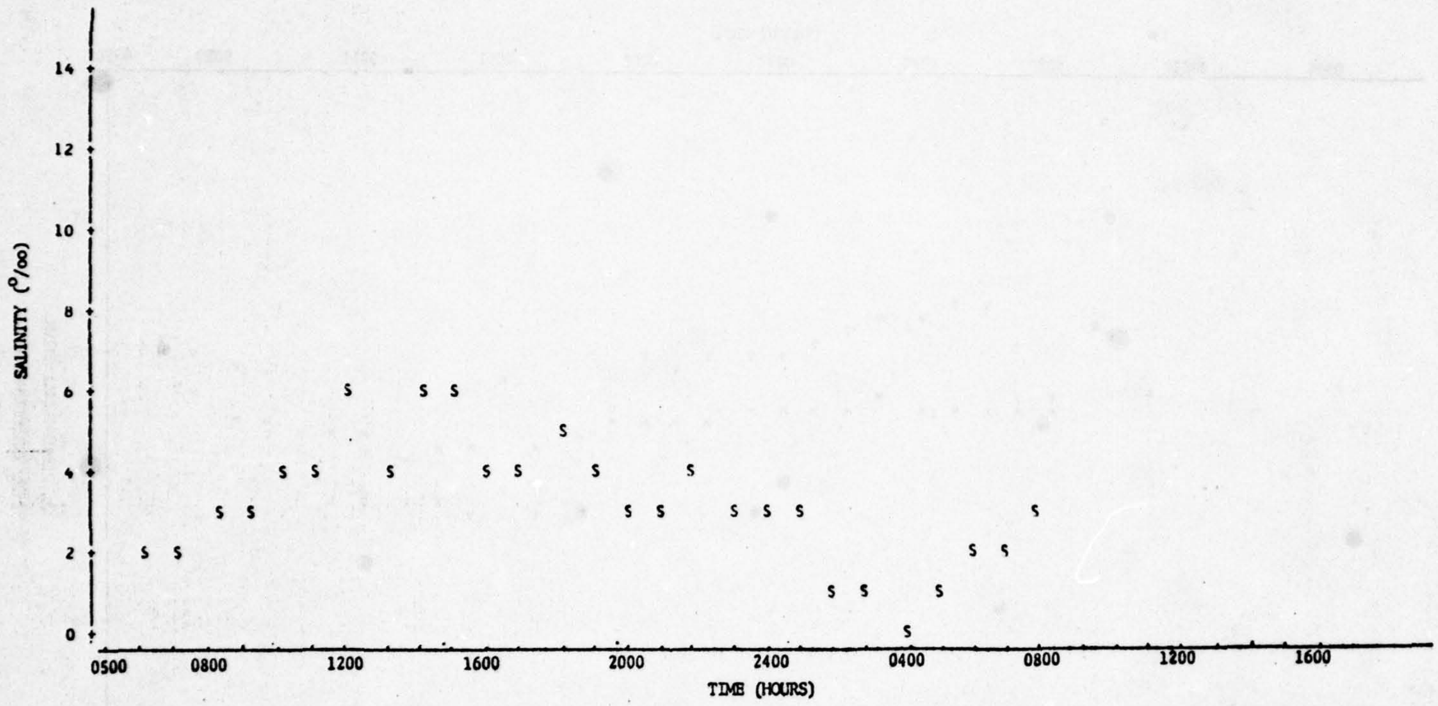
PLOT OF TIME*AIR_T LEGEND: SYMBOL USED IS CHARACTER A
PLOT OF TIME*WAT_T LEGEND: SYMBOL USED IS CHARACTER W



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM

18 - 19 May 1977

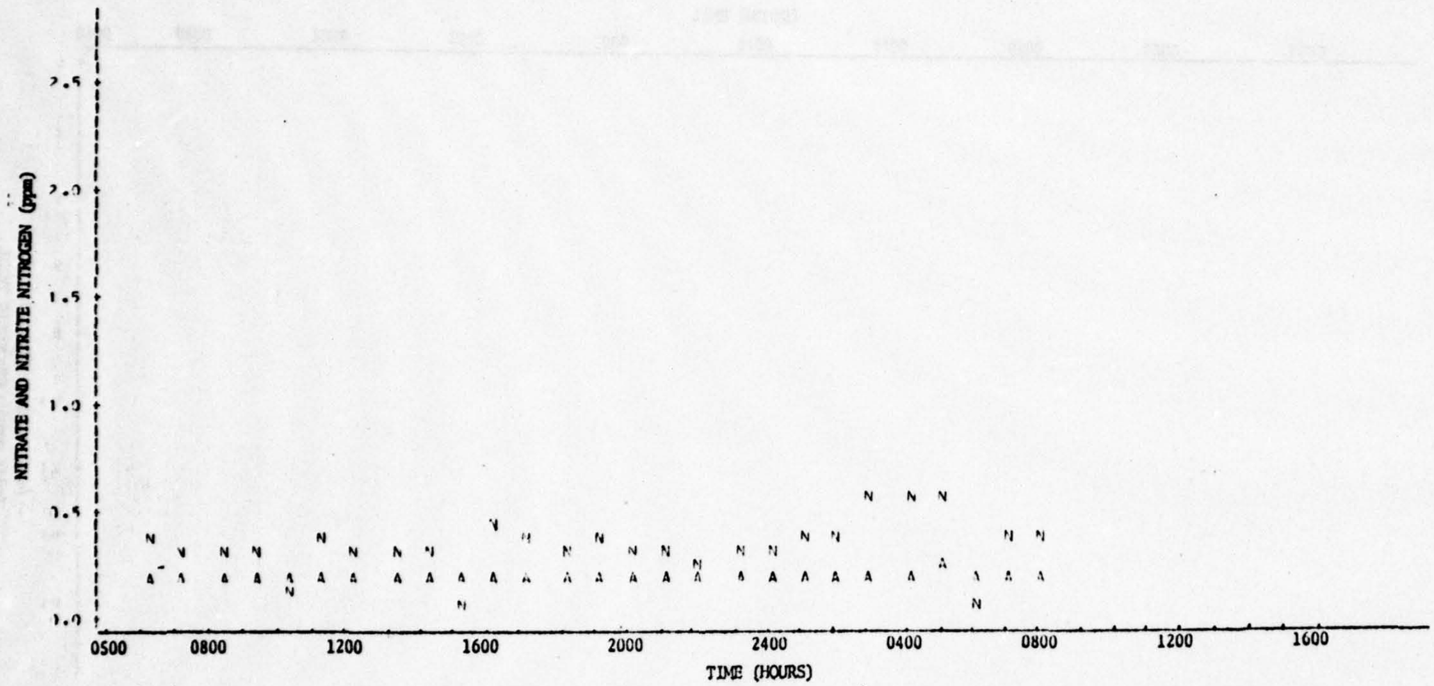
PLOT OF TIME*SAL   LEGEND: SYMBOL USED IS S



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

18 - 19 May 1977

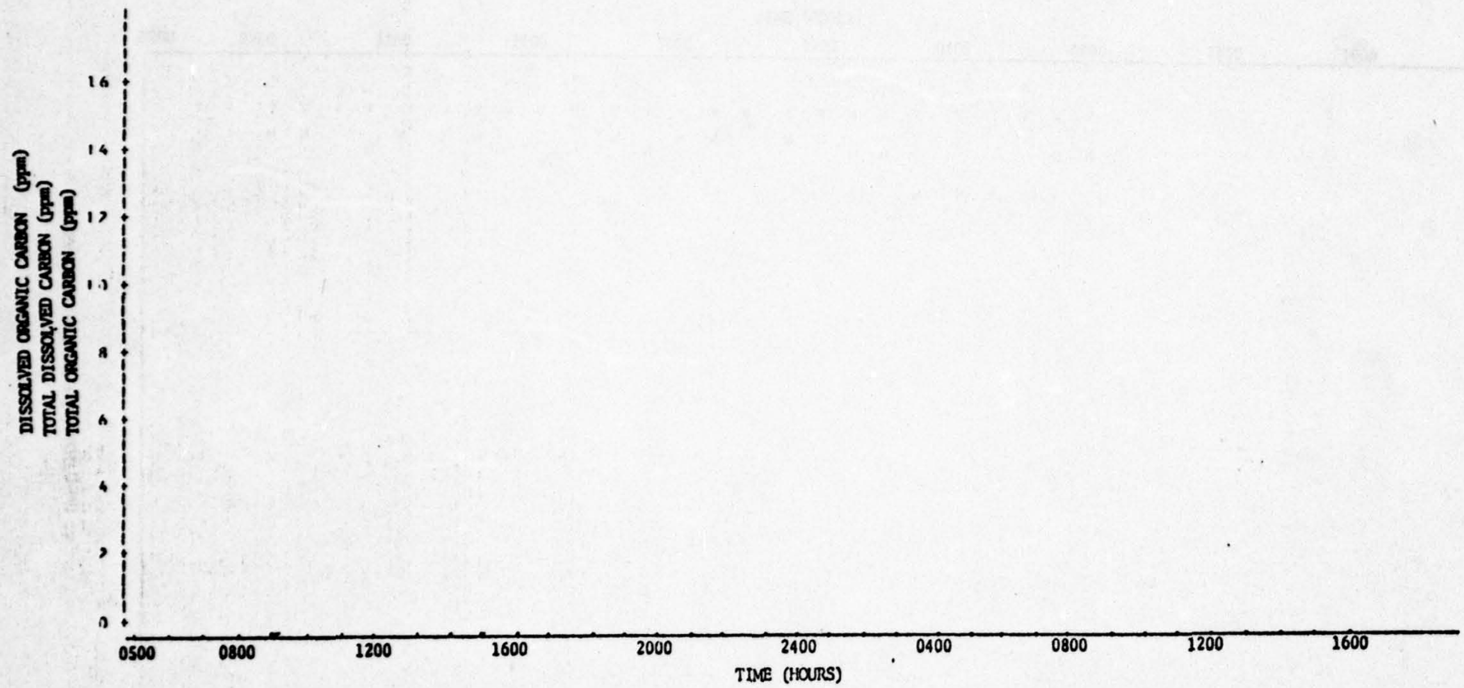
PLOT OF TIME*NITA LEGEND: SYMBOL USED IS CHARACTER N
PLOT OF TIME*AMMO LEGEND: SYMBOL USED IS CHARACTER A



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM   30

18 - 19 May 1977

PLOT OF TIME*DOC   LEGEND: SYMBOL USED IS CHARACTER D
PLOT OF TIME*TDC   LEGEND: SYMBOL USED IS CHARACTER T
PLOT OF TIME*TOC   LEGEND: SYMBOL USED IS CHARACTER O

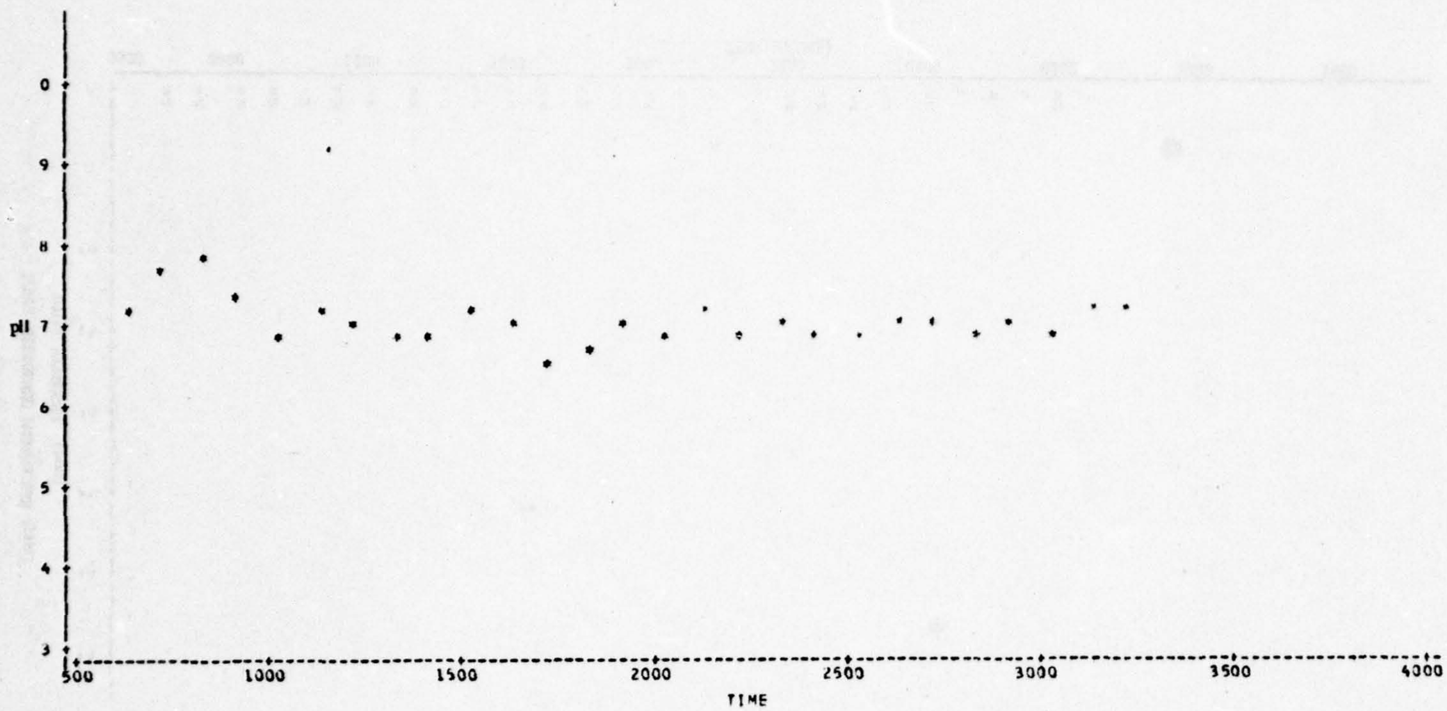


A178

PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM 48

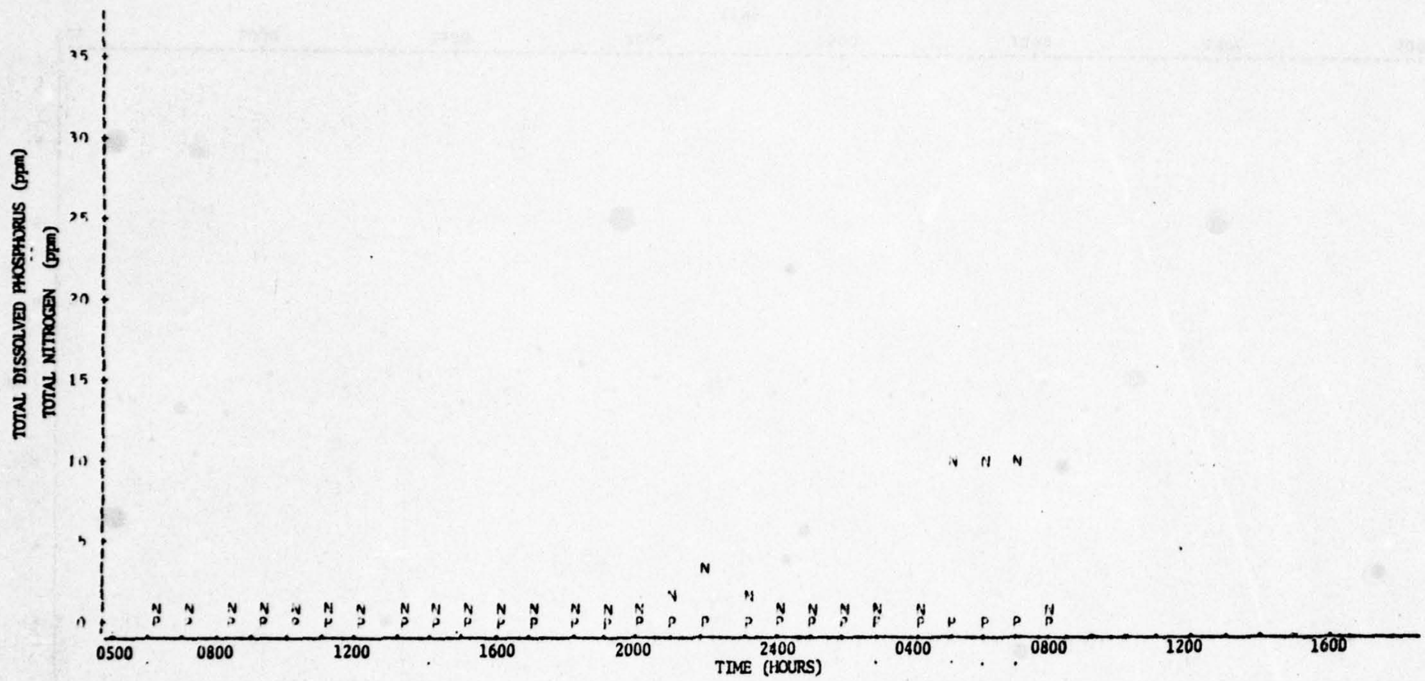
18 - 19 May 1977

PLOT OF TIME*P LEGEND: SYMBOL USED IS *



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM 51
18 - 19 May 1977

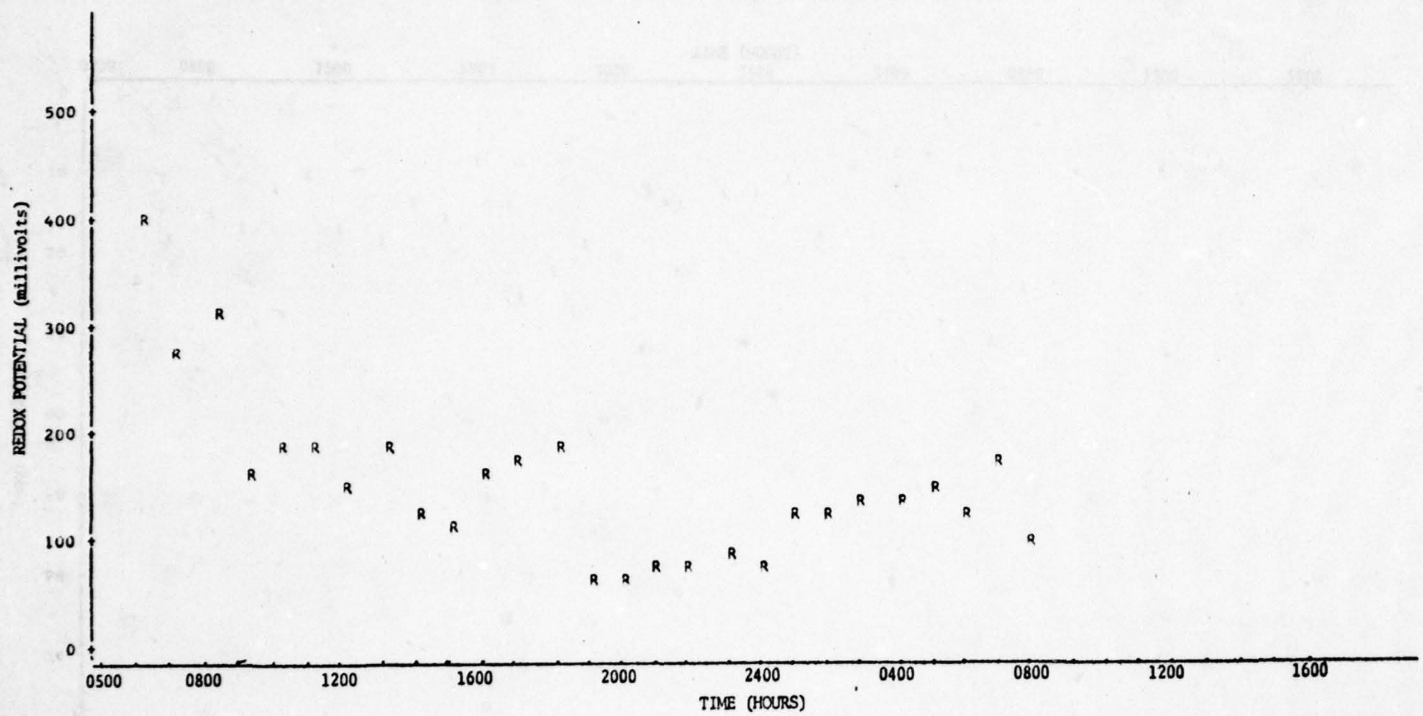
PLOT OF TIME*DPHOS LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*TNIT LEGEND: SYMBOL USED IS CHARACTER N



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

18 - 19 May 1977

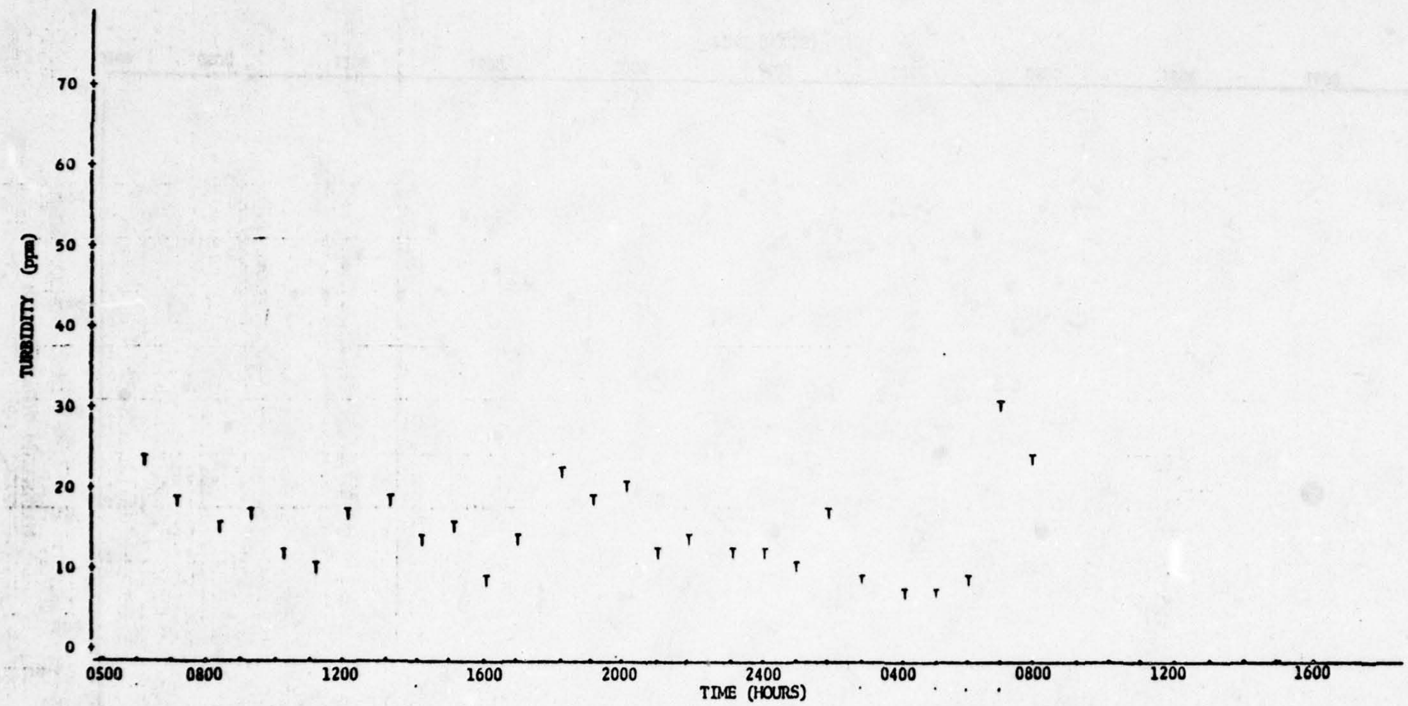
PLOT OF TIME*REDOX LEGEND: SYMBOL USED IS R



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

18 - 19 May 1977

PLOT OF TIME*TURB LEGEND: SYMBOL USED IS T

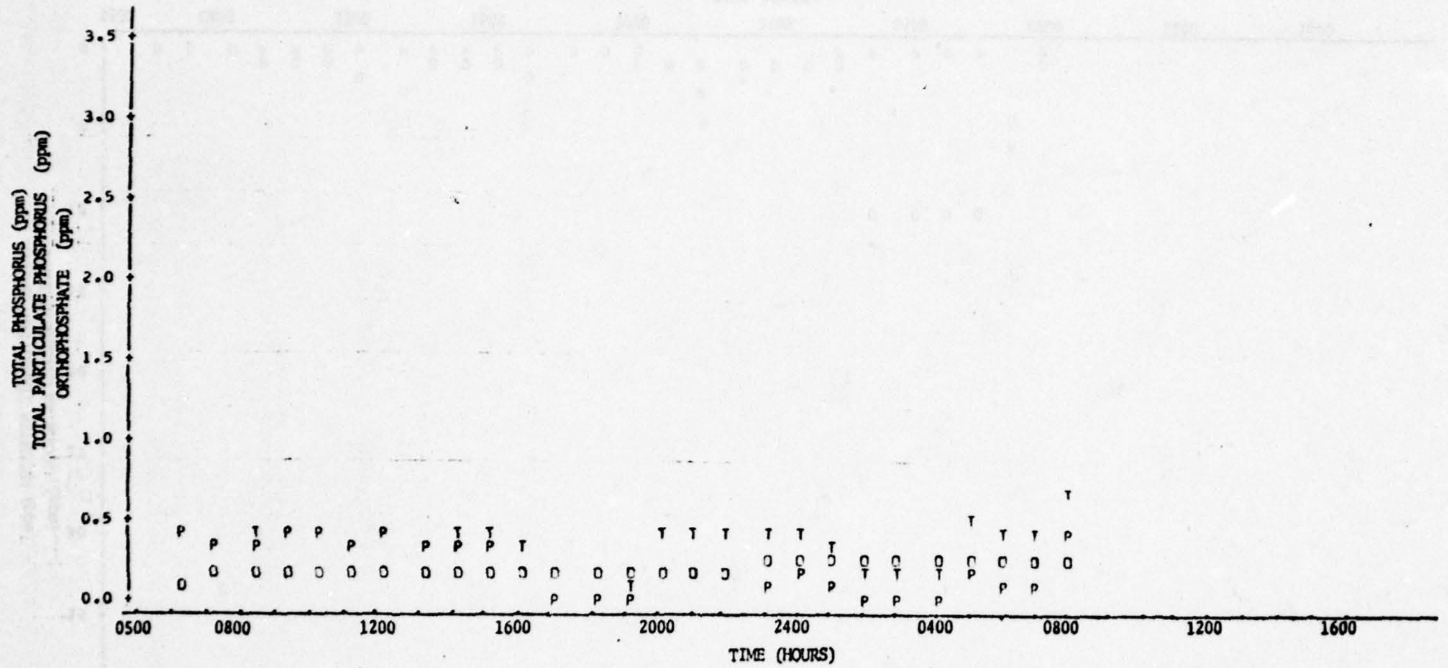


A182

PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM

18 - 19 May 1977

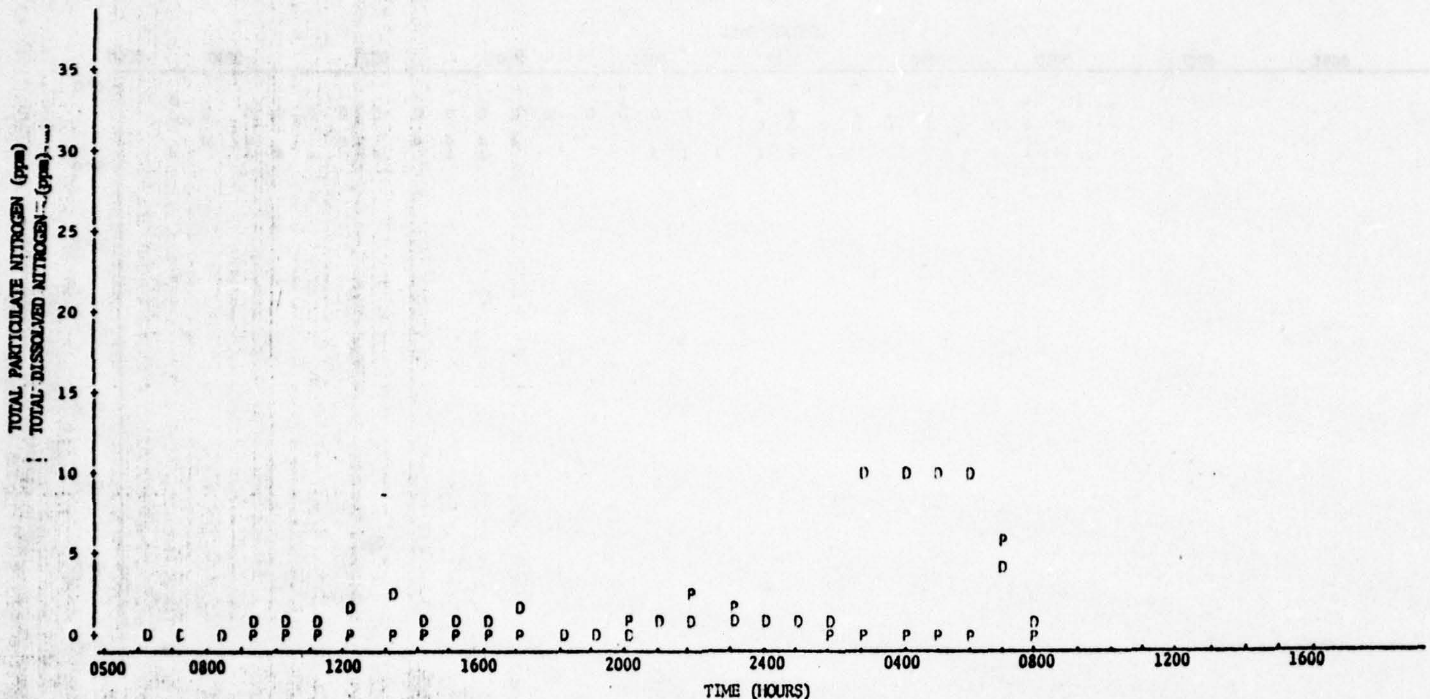
PLOT OF TIME*TPHOS   LEGEND: SYMBOL USED IS CHARACTER T
PLOT OF TIME*PPHOS   LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*OPHOS   LEGEND: SYMBOL USED IS CHARACTER O



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM   116

18 - 19 May 1977

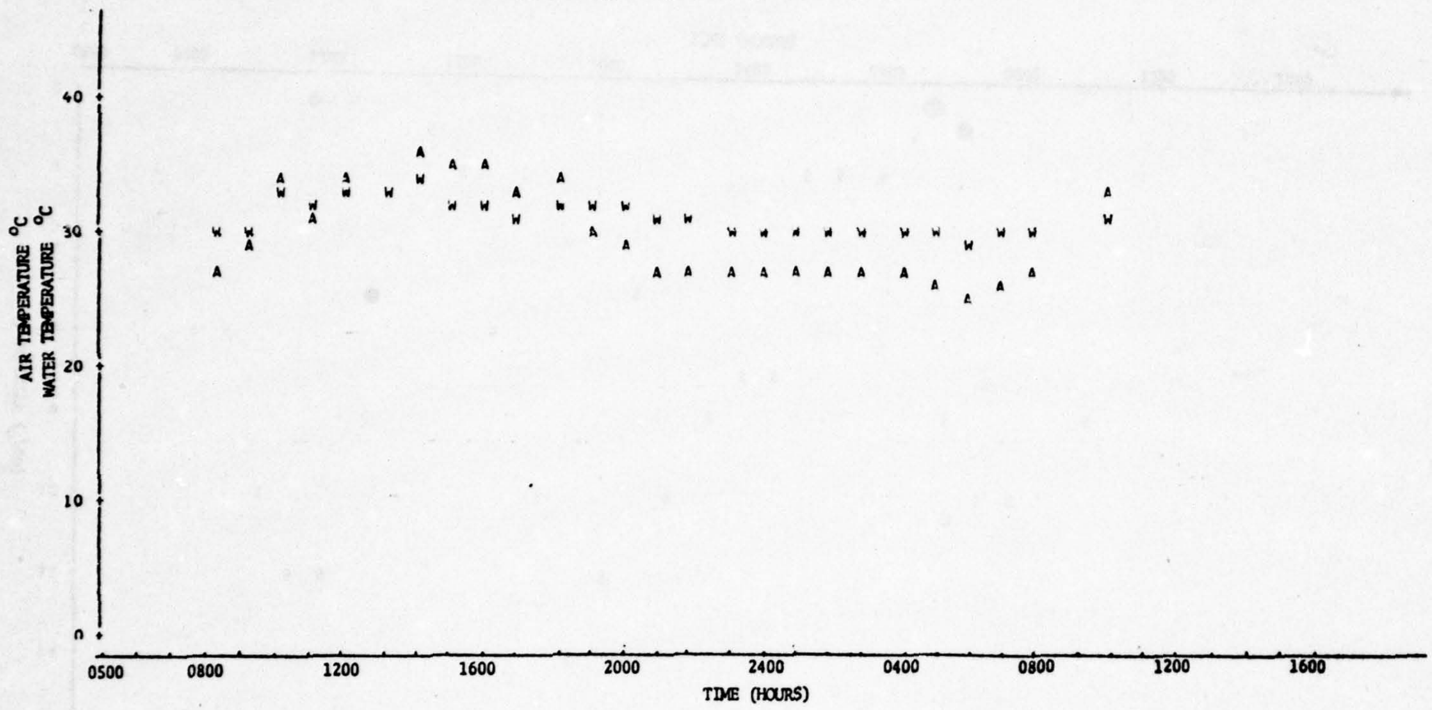
PLOT OF TIME*PNIT   LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*DNIT   LEGEND: SYMBOL USED IS CHARACTER D



A184

13 - 14 July 1977

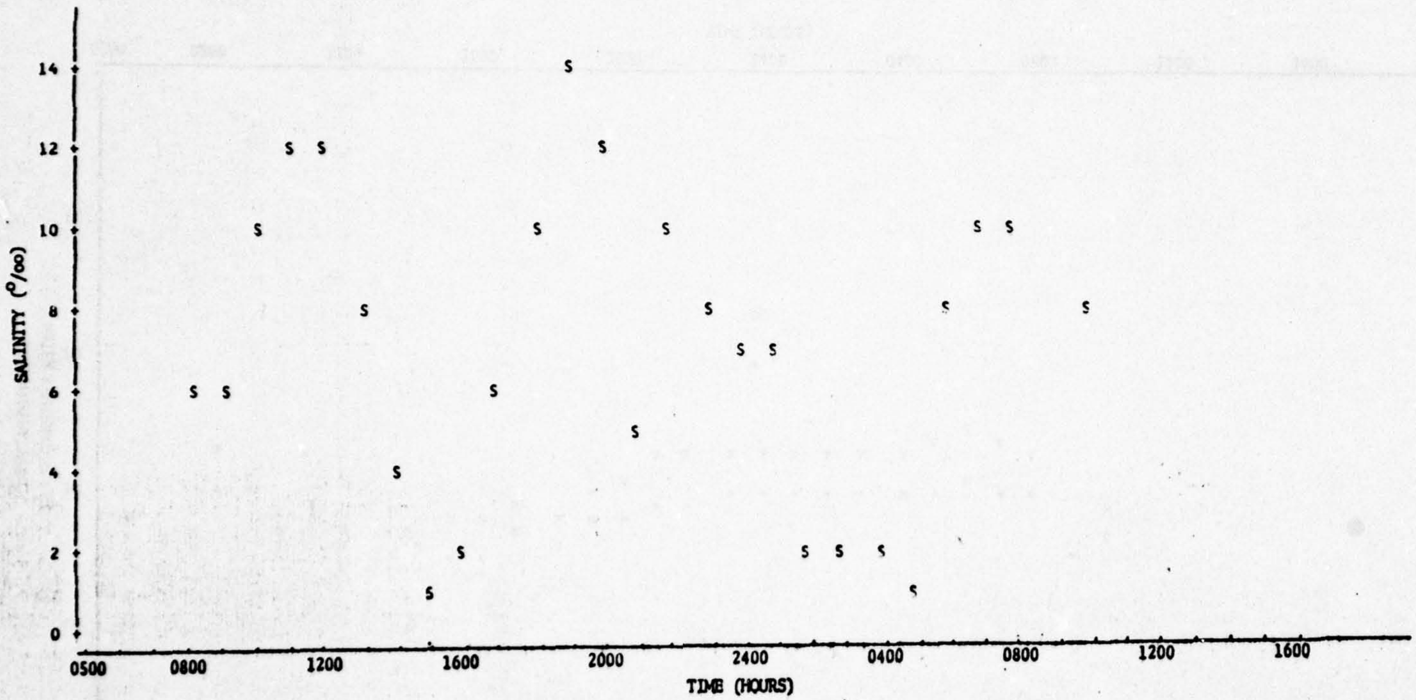
PLOT OF TIME*AIR_T LEGEND: SYMBOL USED IS CHARACTER A
PLOT OF TIME*WAT_T LEGEND: SYMBOL USED IS CHARACTER W



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM   30

13 - 14 July 1977

PLOT OF TIME*SAL   LEGEND: SYMBOL USED IS S

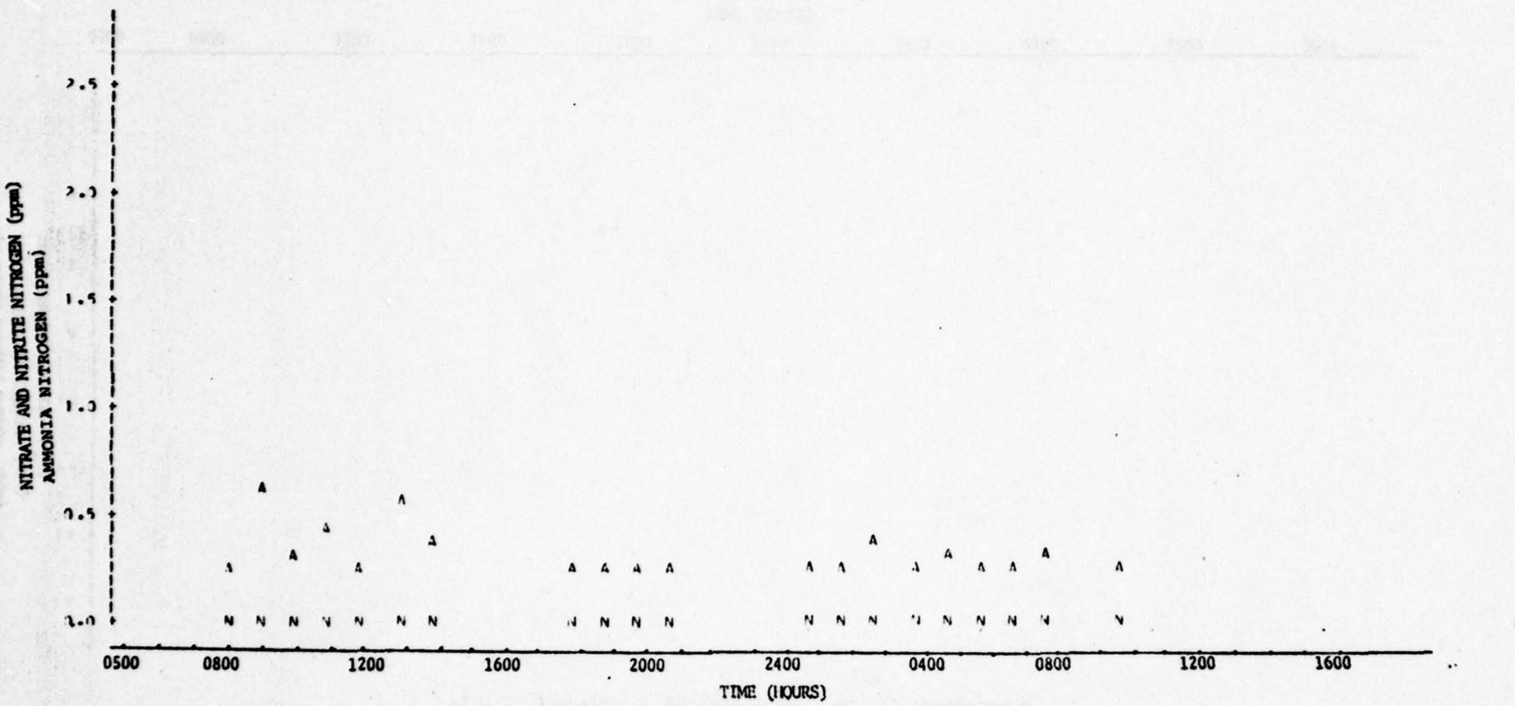


A186

PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM 31

13 - 14 July 1977

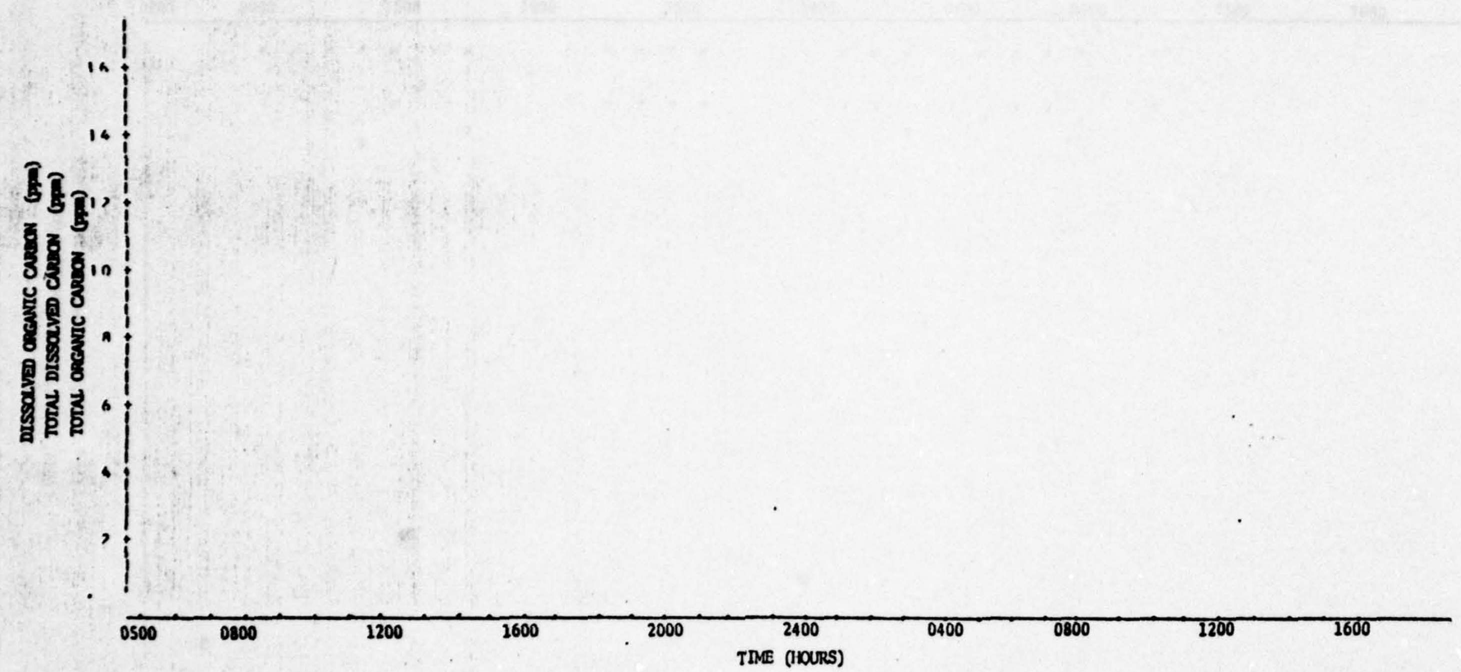
PLOT OF TIME*NITA LEGEND: SYMBOL USED IS CHARACTER N
PLOT OF TIME*AMMO LEGEND: SYMBOL USED IS CHARACTER A



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

13 - 14 July 1977

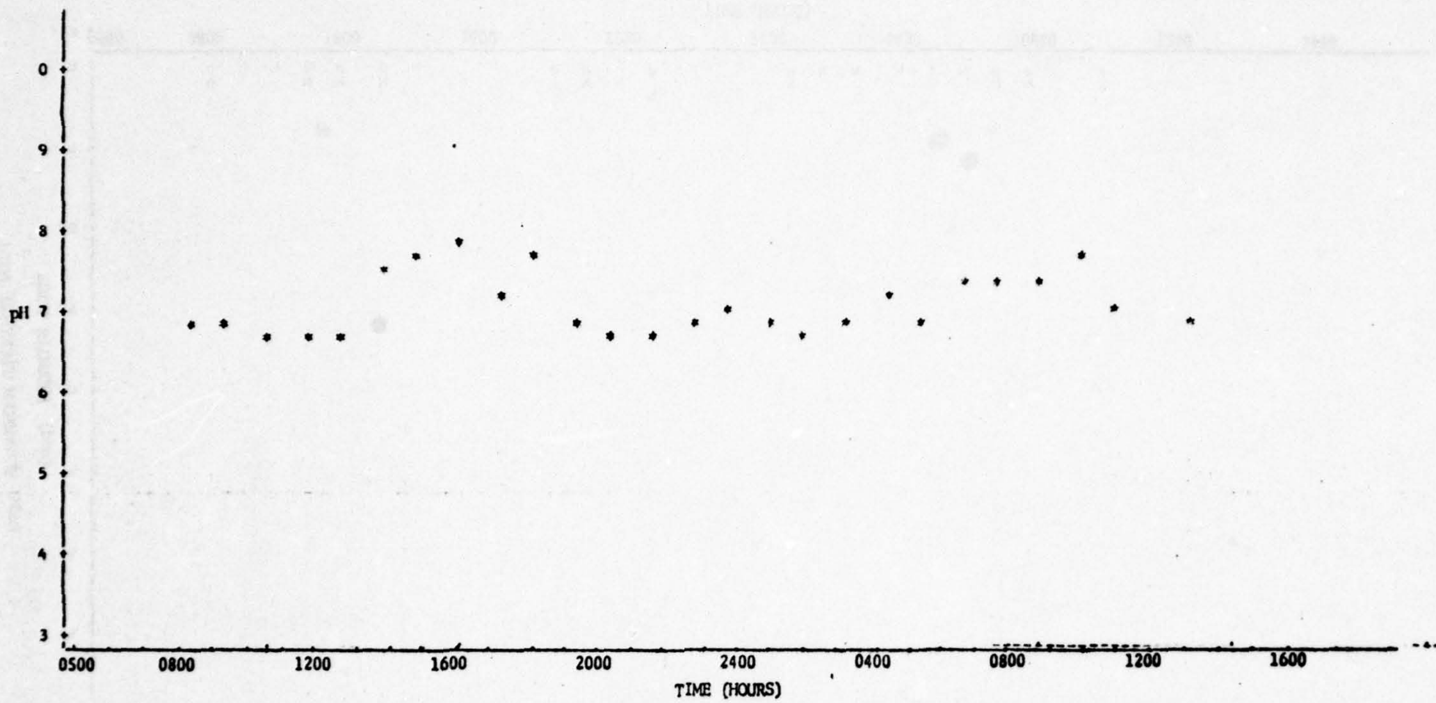
PLOT OF TIME*DIC LEGEND: SYMBOL USED IS CHARACTER D
PLOT OF TIME*TDC LEGEND: SYMBOL USED IS CHARACTER T
PLOT OF TIME*TOC LEGEND: SYMBOL USED IS CHARACTER O



PHYSICAL AND CHEMICAL CHARACTERIZATICN OF BUTTERMILK SOUND WATEP COLUMN   PROC SCATTEP UNIFORM

13 - 14 July 1977

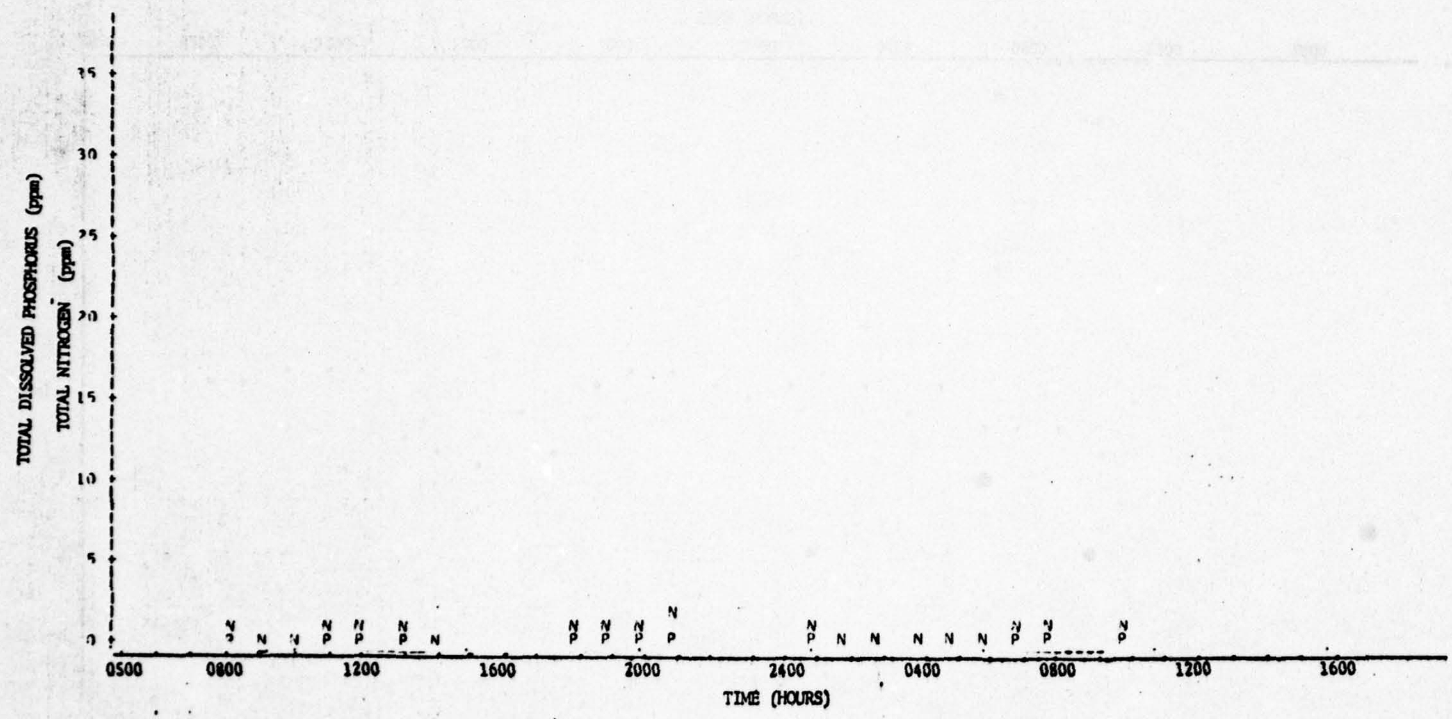
PLOT OF TIME*P   LEGEND: SYMBOL USED IS *



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM

13 - 14 July 1977

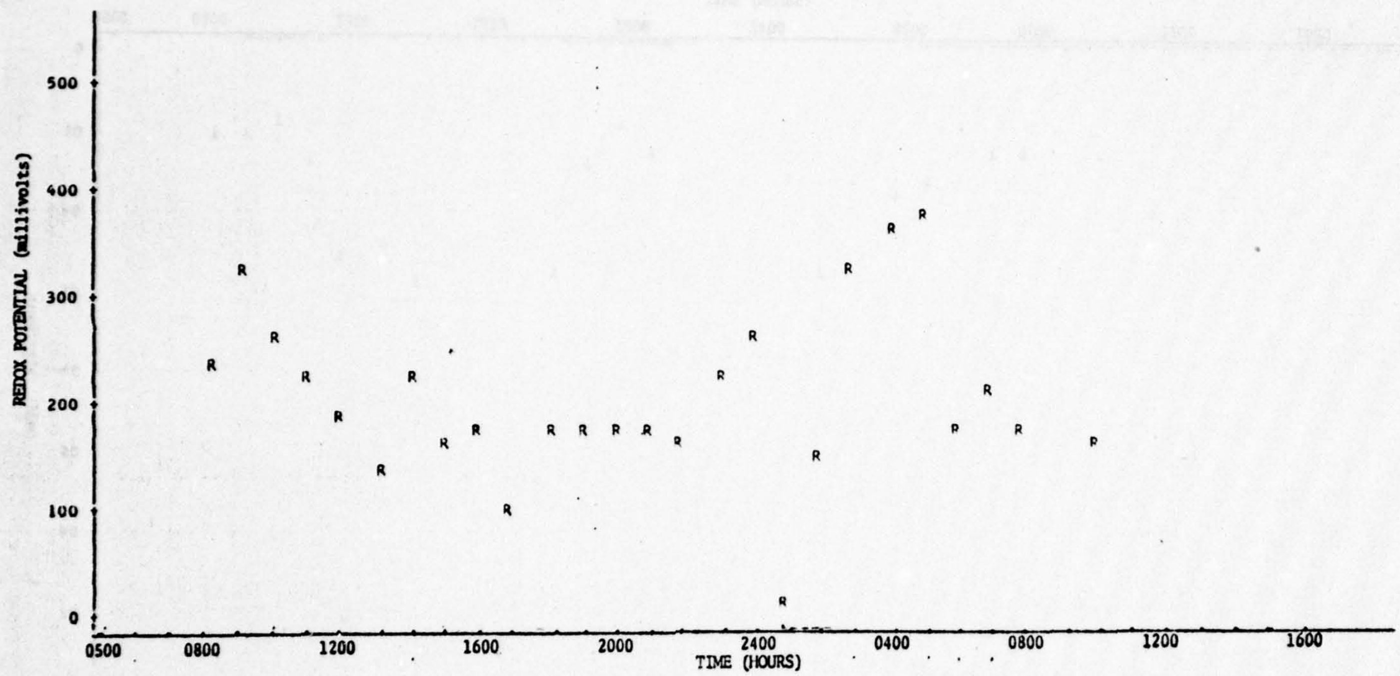
PLOT OF TIME*DPHOS   LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*TNIT   LEGEND: SYMBOL USED IS CHARACTER N



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

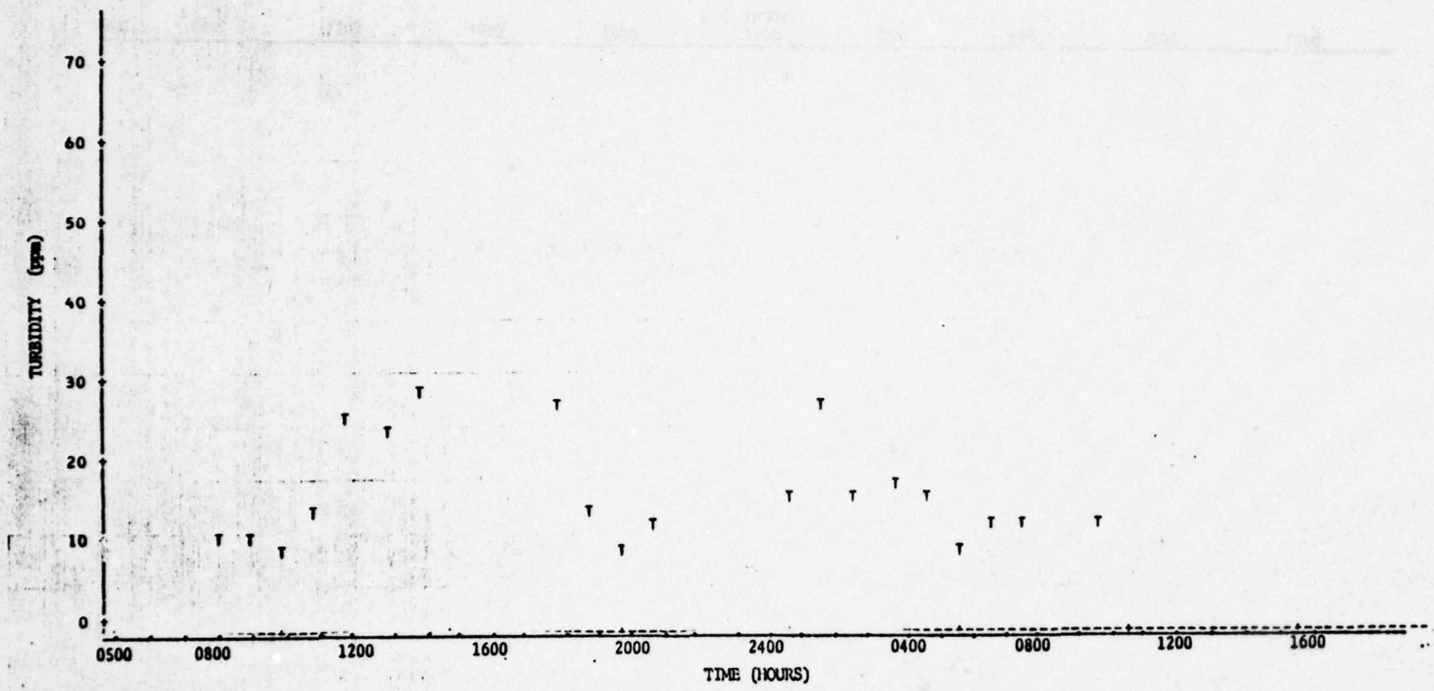
13 - 14 July 1977

PLOT OF TIME*REDOX LEGEND: SYMBOL USED IS R



13 - 14 July 1977

PLOT OF TIME*TURB LEGEND: SYMBOL USED IS T

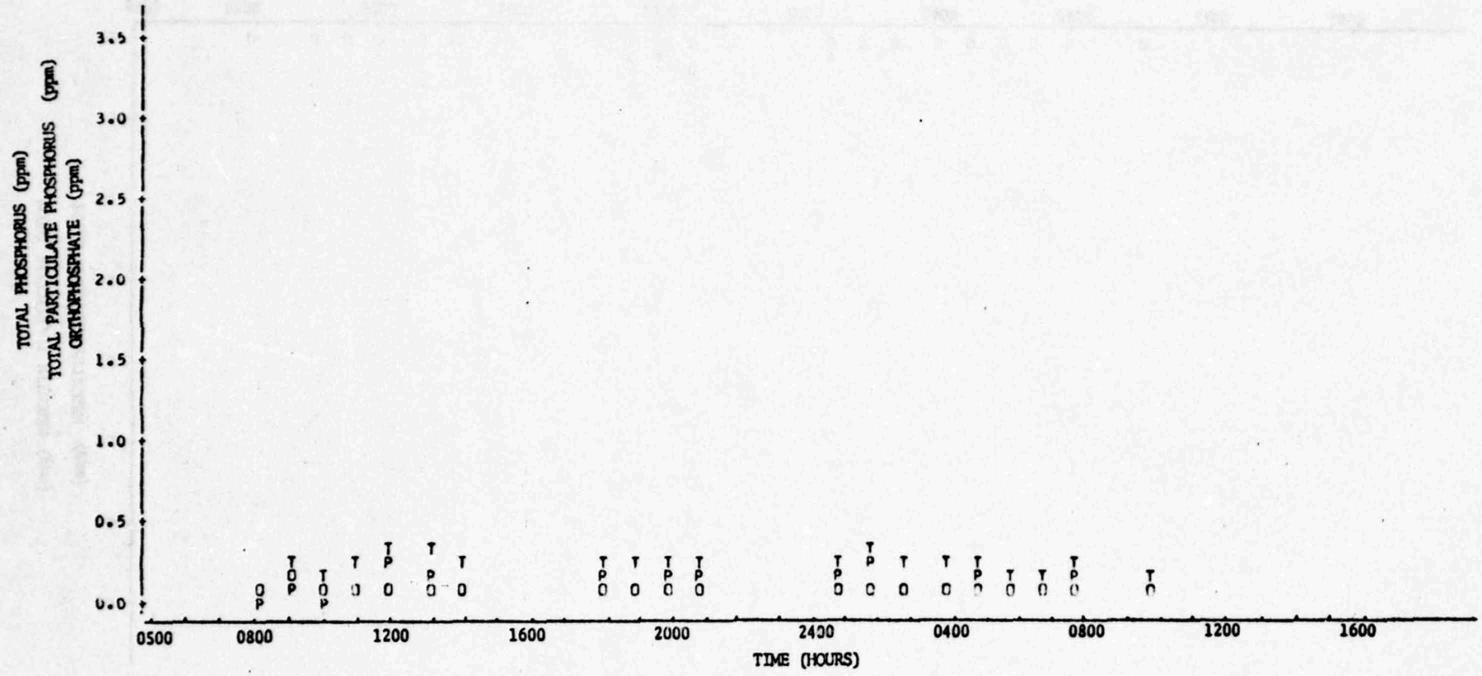


A192

PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

13 - 14 July 1977

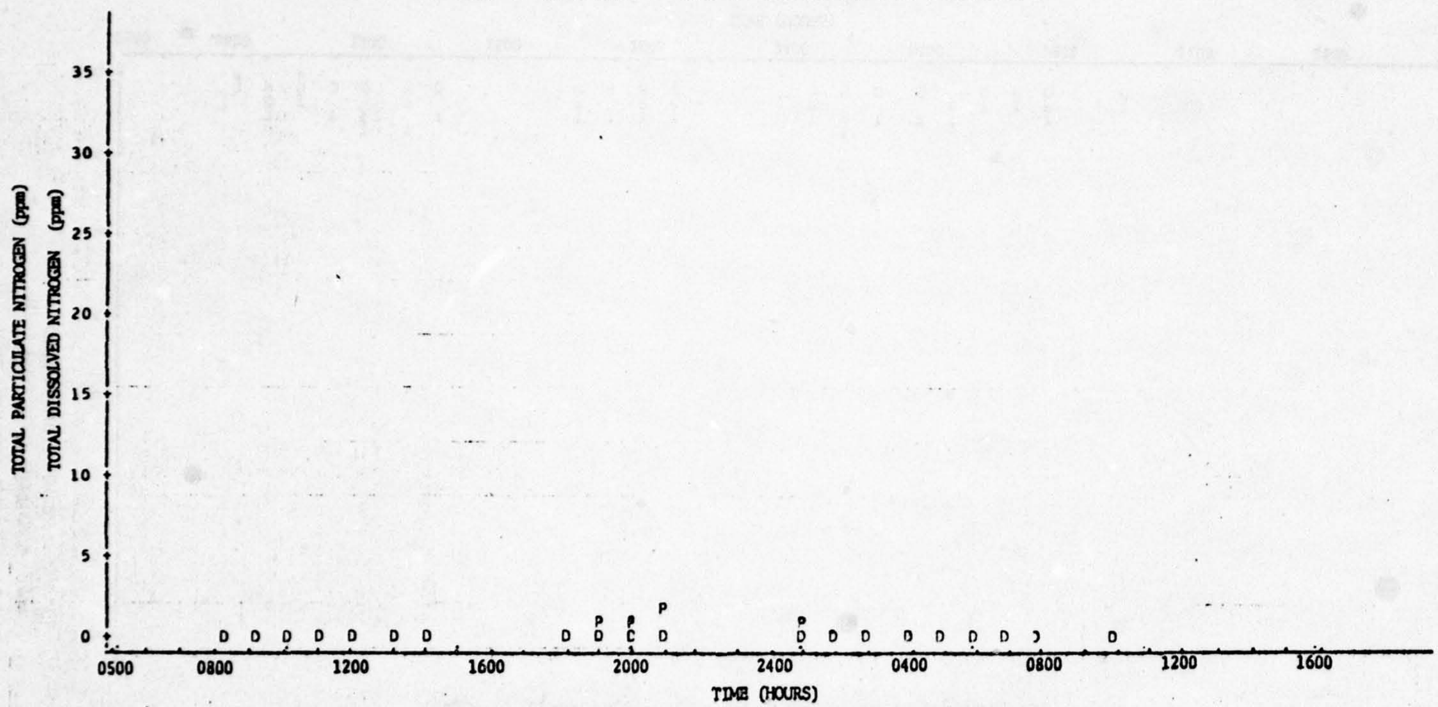
PLOT OF TIME*TPHOS LEGEND: SYMBOL USED IS CHARACTER T
PLOT OF TIME*PPHOS LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*OPHOS LEGEND: SYMBOL USED IS CHARACTER O



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

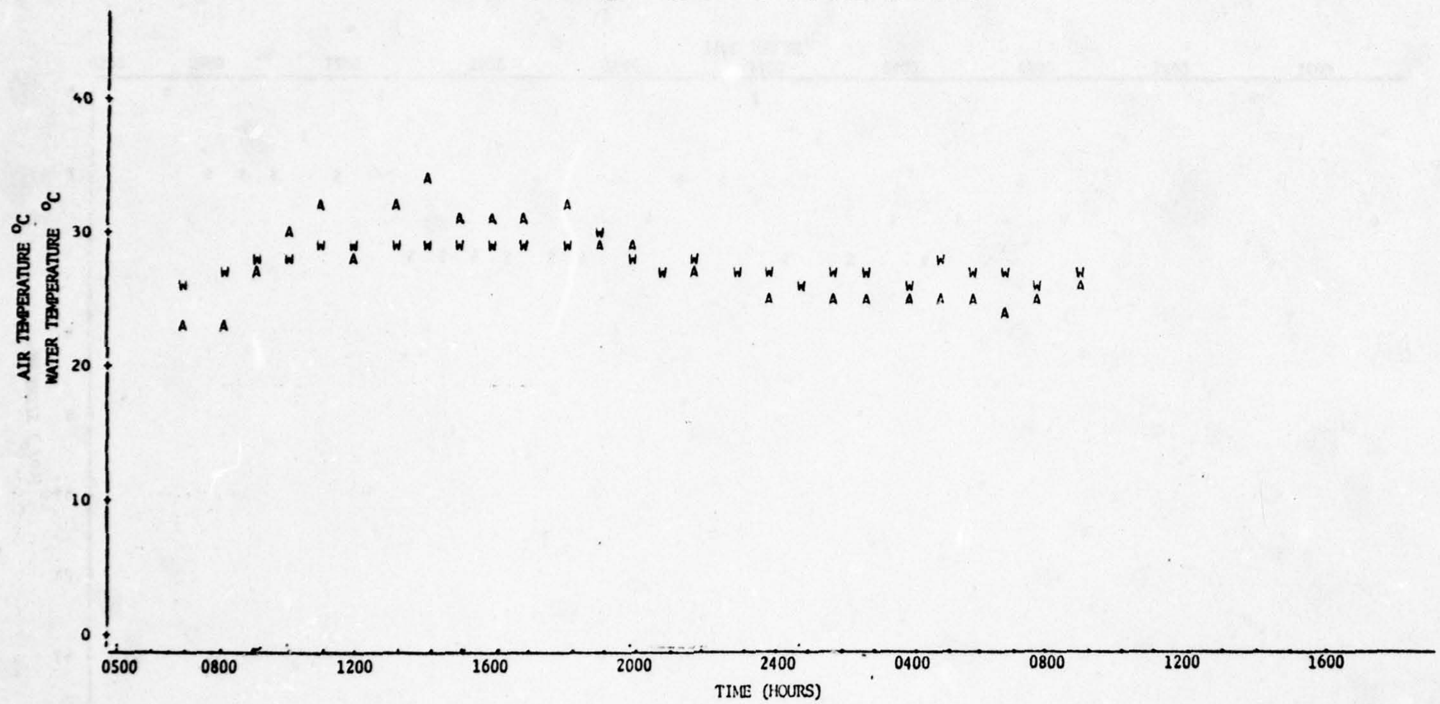
13 - 14 July 1977

PLOT OF TIME*PNIT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*DNIT LEGEND: SYMBOL USED IS CHARACTER D



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM
6 - 7 September 1977

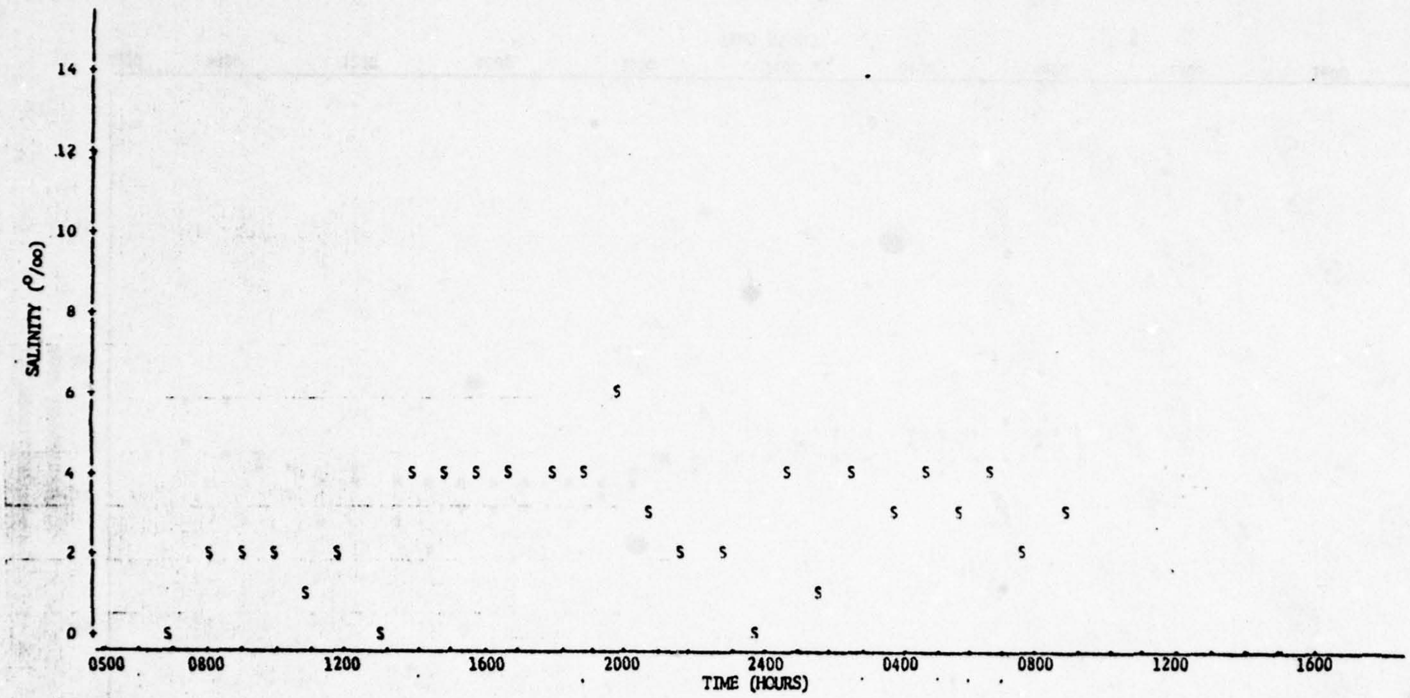
PLOT OF TIME*AIR_T LEGEND: SYMBOL USED IS CHARACTER A
PLOT OF TIME*WAT_T LEGEND: SYMBOL USED IS CHARACTER W



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM   32

6 - 7 September 1977

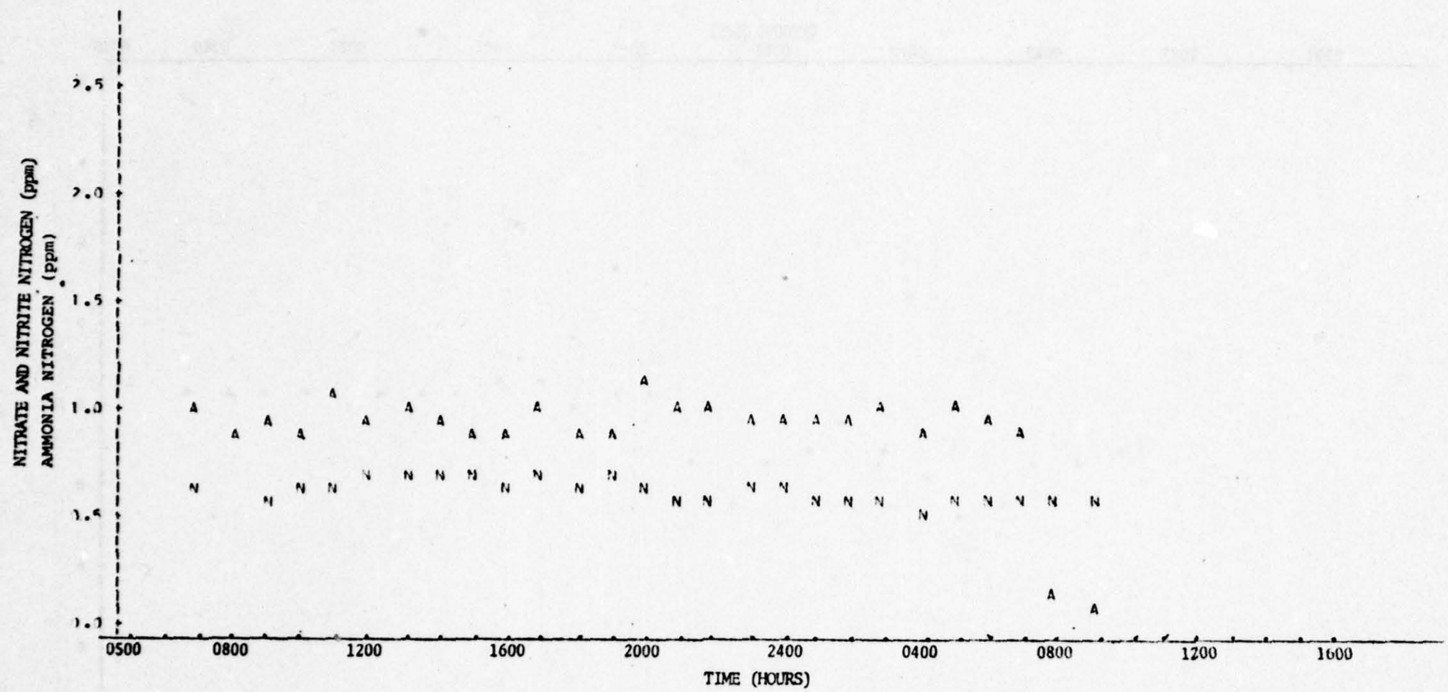
PLOT OF TIME*SAL   LEGEND: SYMBOL USED IS S



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN   PROC SCATTER UNIFORM

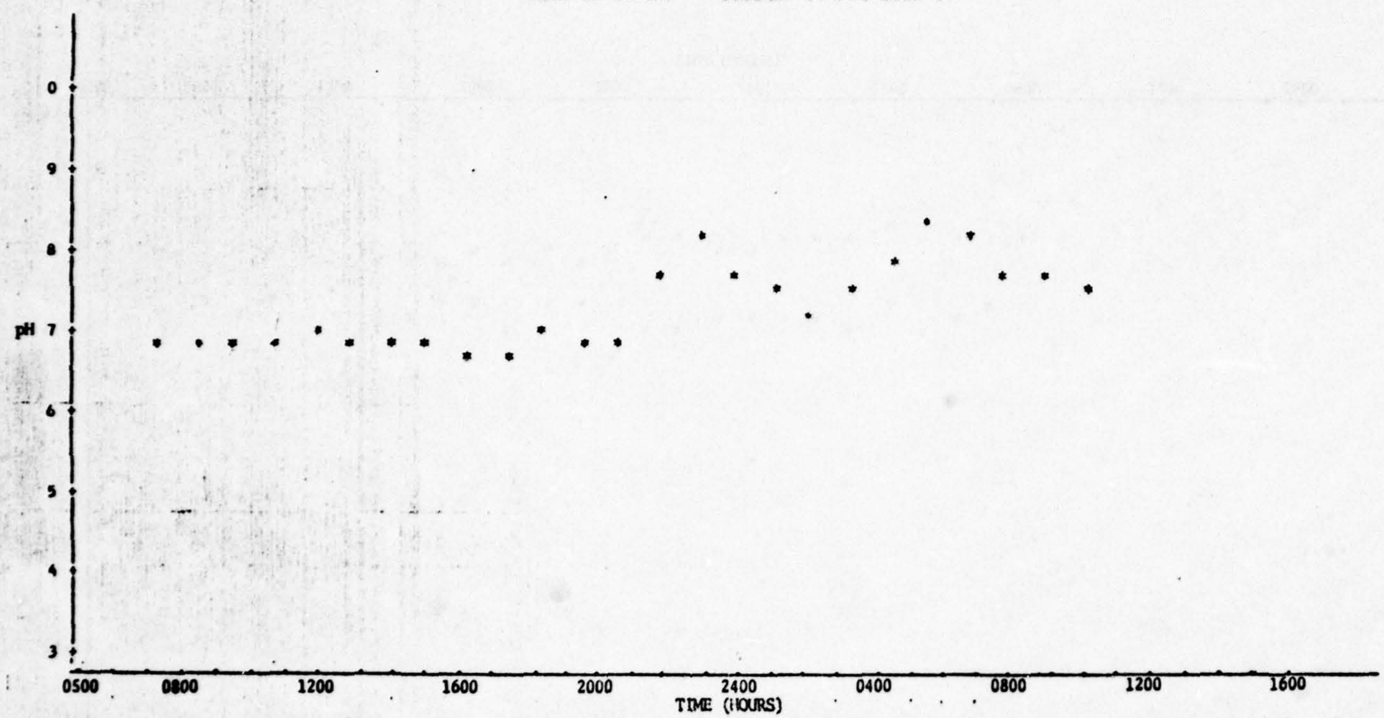
6 - 7 September 1977

PLOT OF TIME*NITA   LEGEND: SYMBOL USED IS CHARACTER N
PLOT OF TIME*AMMO   LEGEND: SYMBOL USED IS CHARACTER A



6 - 7 September 1977

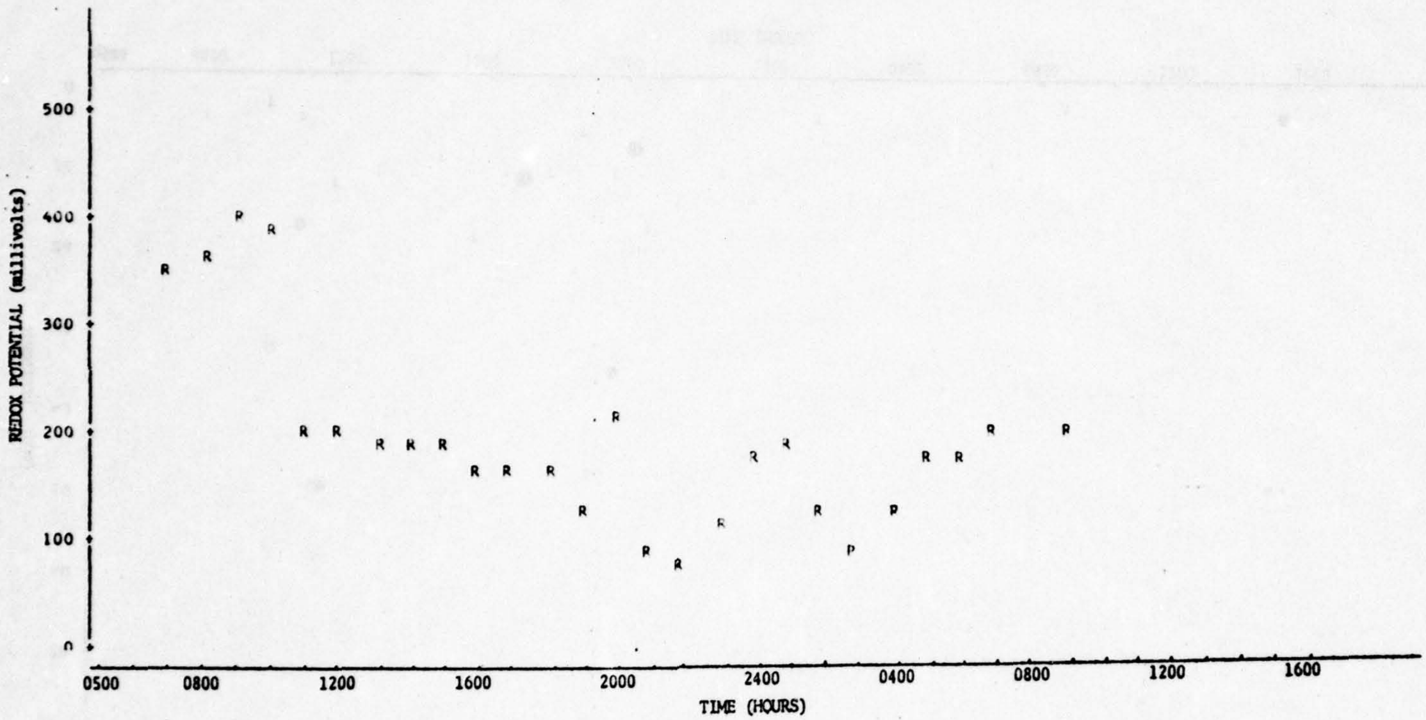
PLOT OF TIME*P LEGEND: SYMBOL USED IS *



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM 57

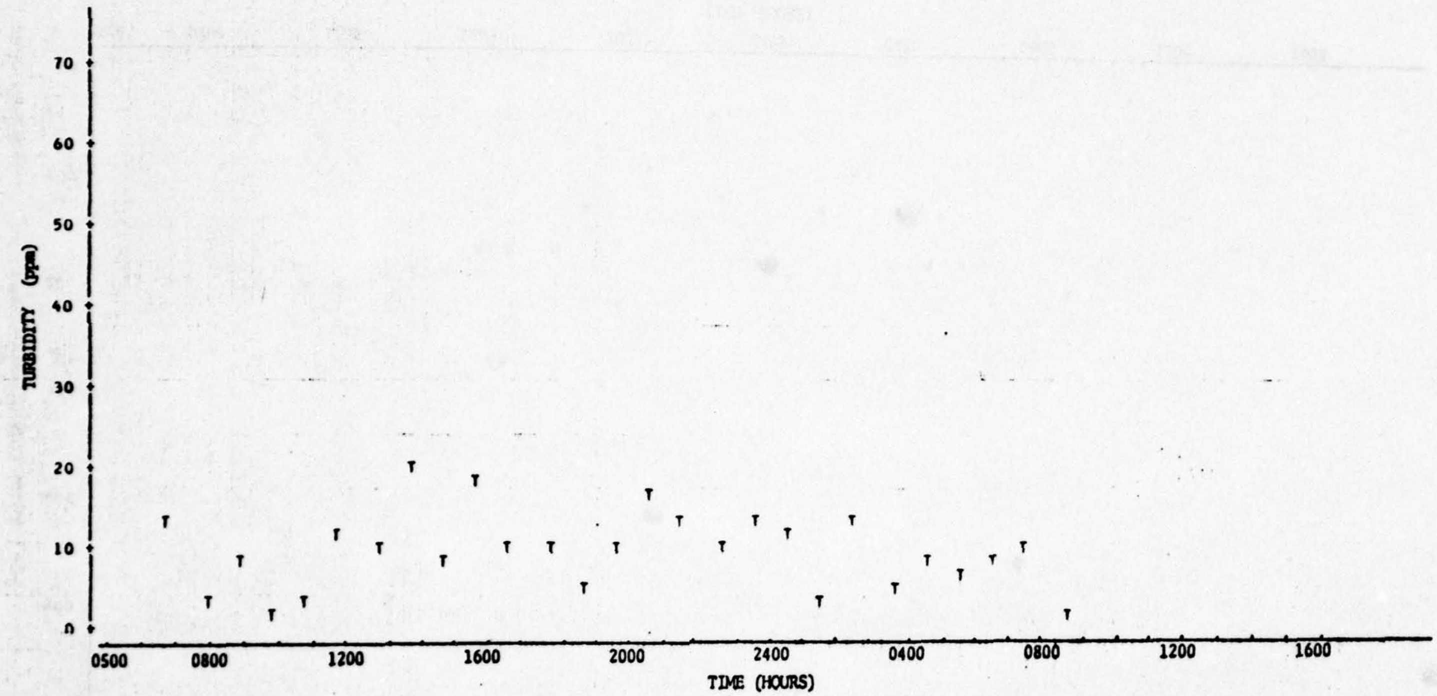
6 - 7 September 1977

PLOT OF TIME*REDOX LEGEND: SYMBOL USED IS R



6 - 7 September 1977

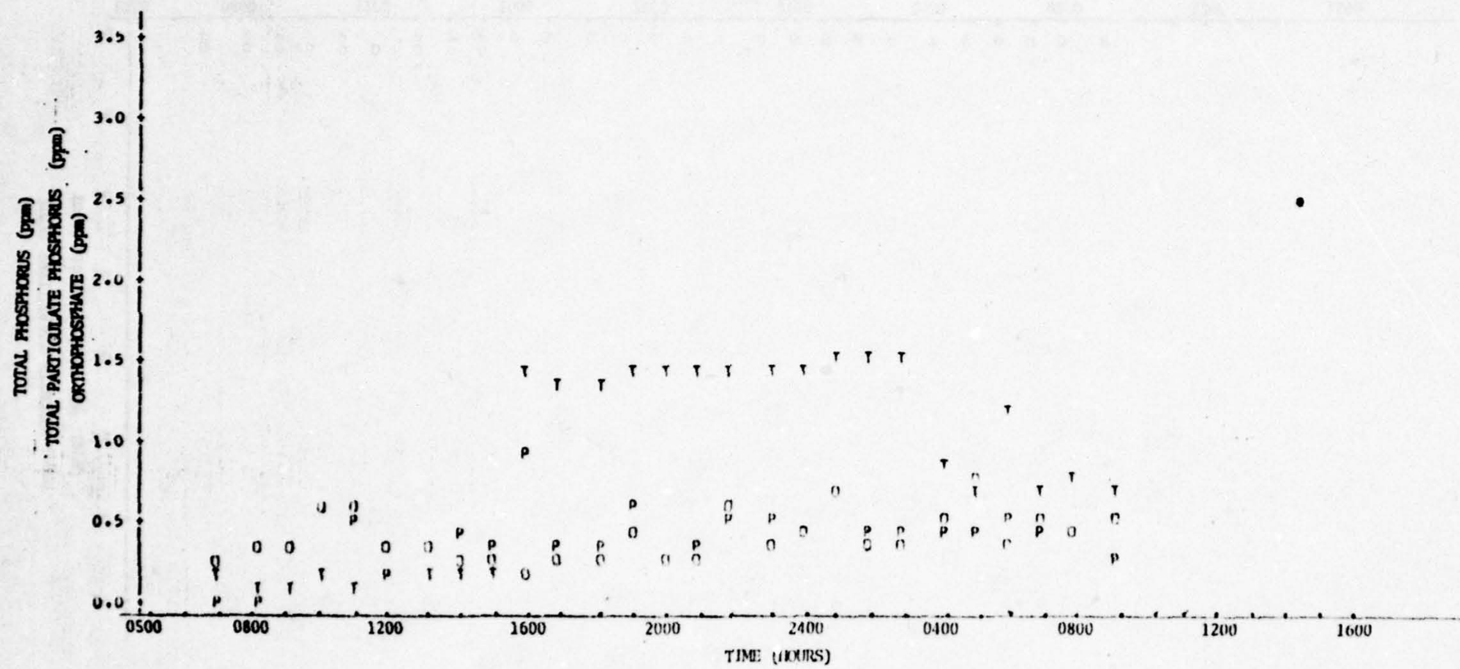
PLOT OF TIME*TURB   LEGEND: SYMBOL USED IS T



A200

6 - 7 September 1977

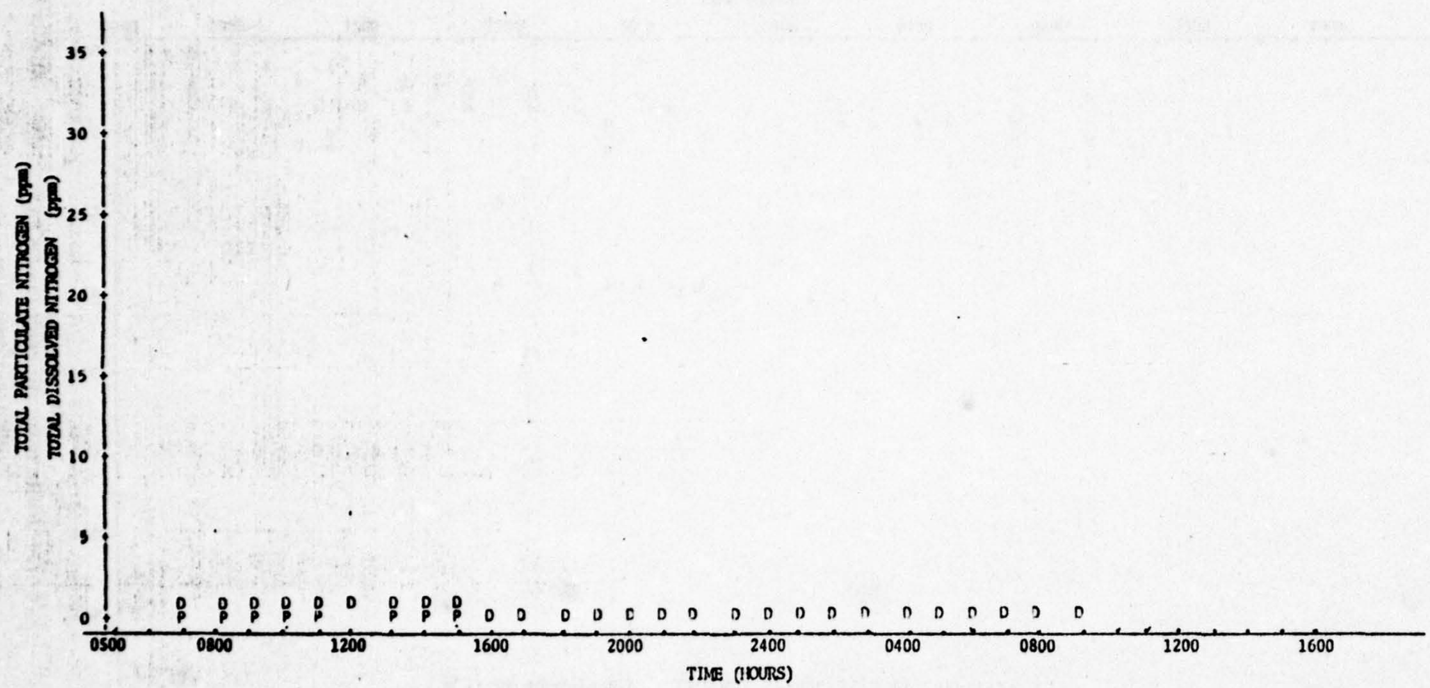
PLOT OF TIME*TPHOS   LEGEND: SYMBOL USED IS CHARACTER T
PLOT OF TIME*PPHOS   LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*OPHOS   LEGEND: SYMBOL USED IS CHARACTER O



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM 118

6 - 7 September 1977

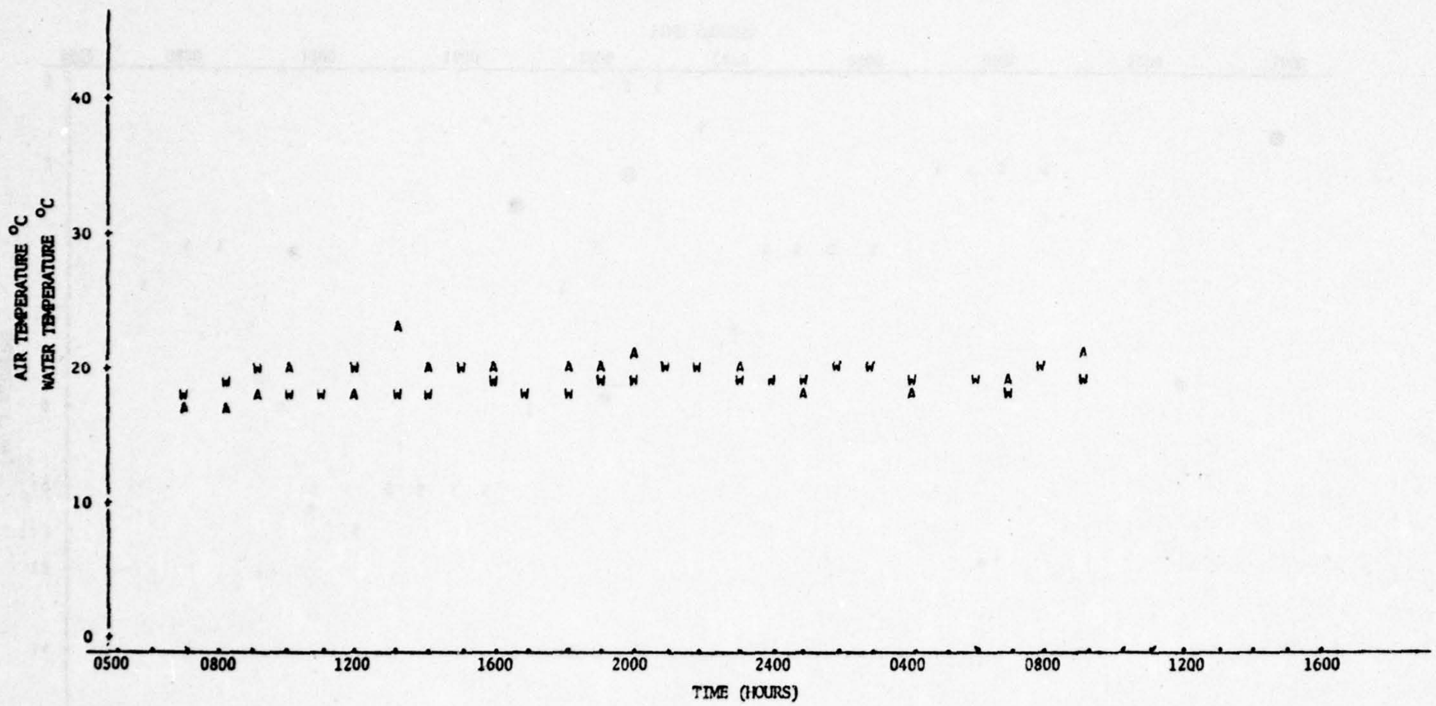
PLOT OF TIME*PNIT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*DNIT LEGEND: SYMBOL USED IS CHARACTER D



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM

1 - 2 November 1977

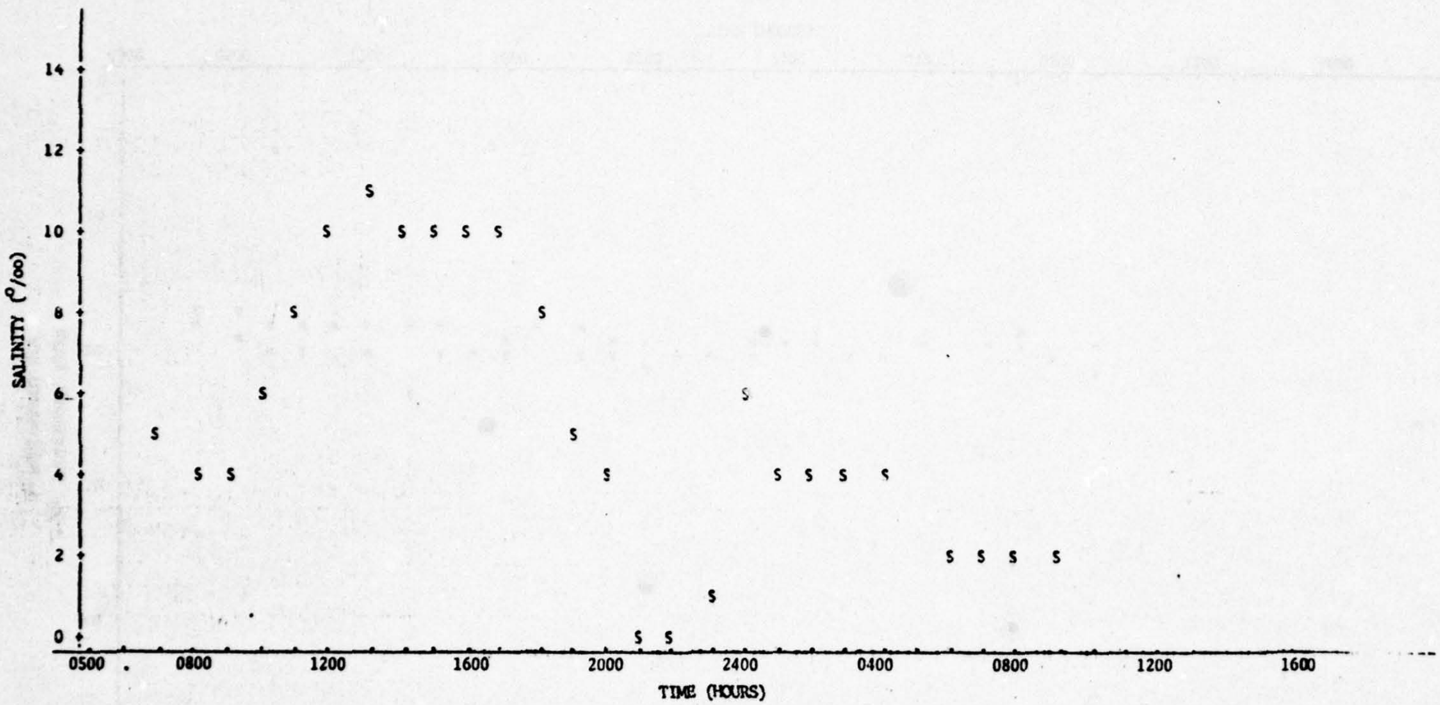
PLOT OF TIME*AIR_T LEGEND: SYMBOL USED IS CHARACTER A
PLOT OF TIME*WAT_T LEGEND: SYMBOL USED IS CHARACTER W



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM 34

1 - 2 November 1977

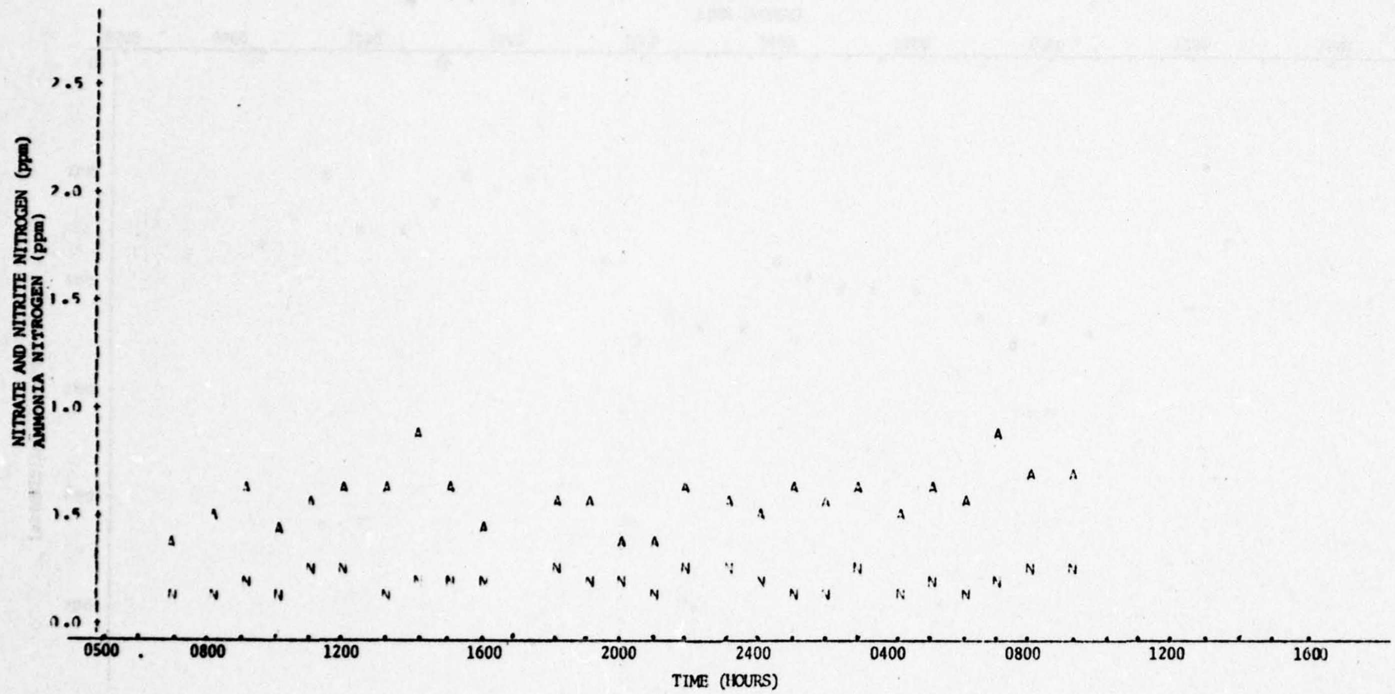
PLOT OF TIME*SAL LEGEND: SYMBOL USED IS S



A204

1 - 2 November 1977

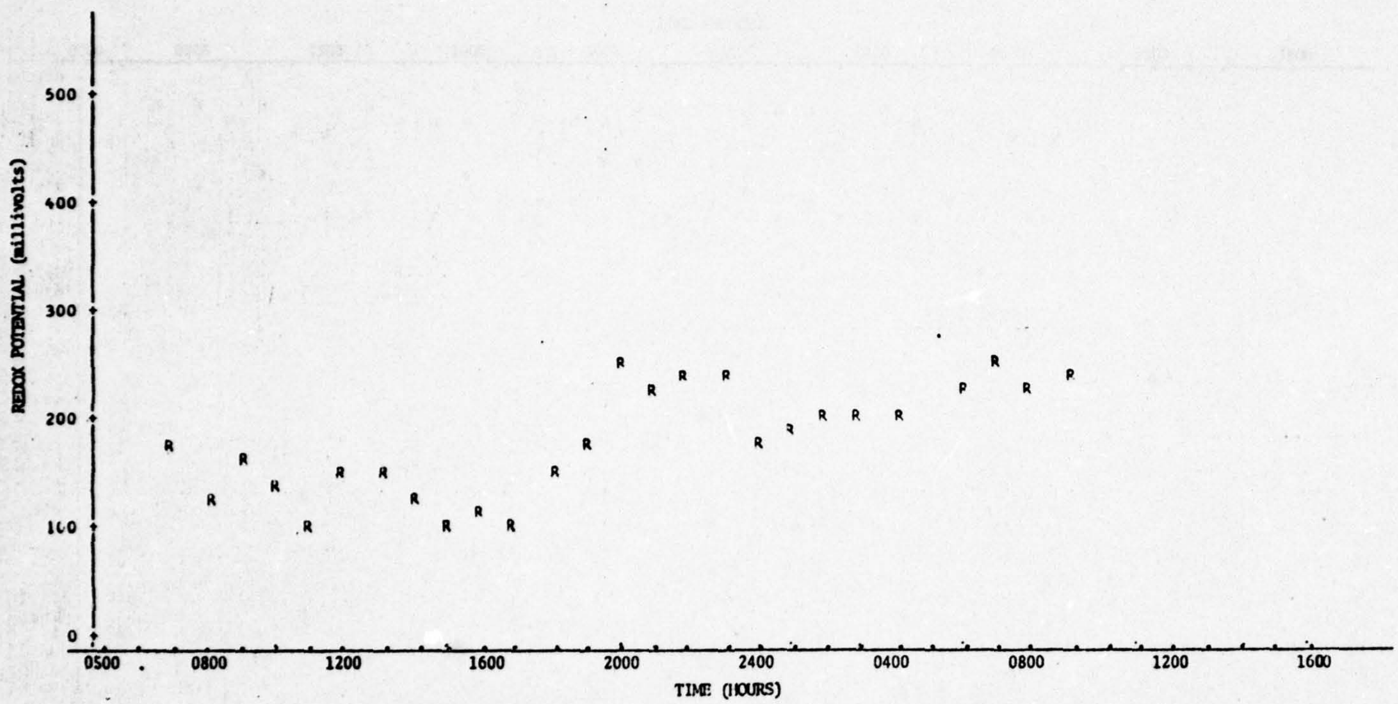
PLOT OF TIME*NITA   LEGEND: SYMBOL USED IS CHARACTER N
PLOT OF TIME*AMMO   LEGEND: SYMBOL USED IS CHARACTER A



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM 58

1 - 2 November 1977

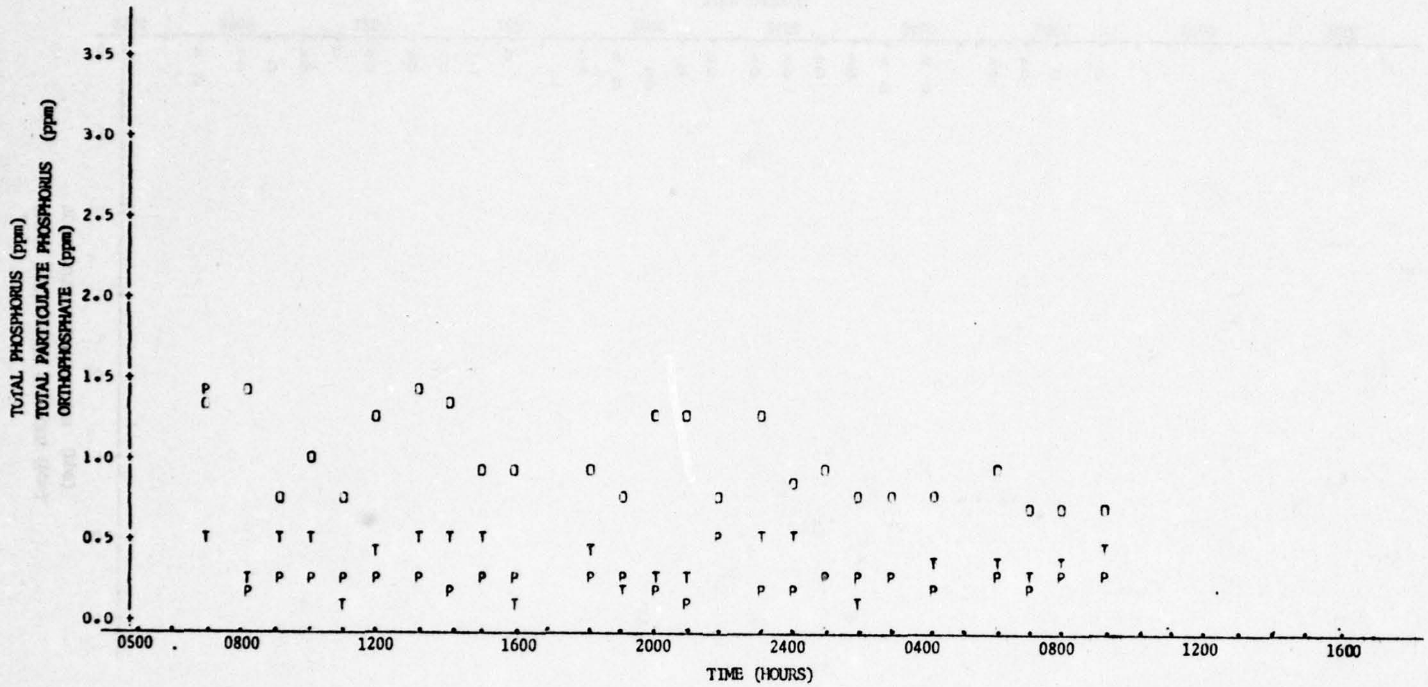
PLOT OF TIME*REDOX LEGEND: SYMBOL USED IS R



PHYSICAL AND CHEMICAL CHARACTERIZATION OF BUTTERMILK SOUND WATER COLUMN PROC SCATTER UNIFORM 102

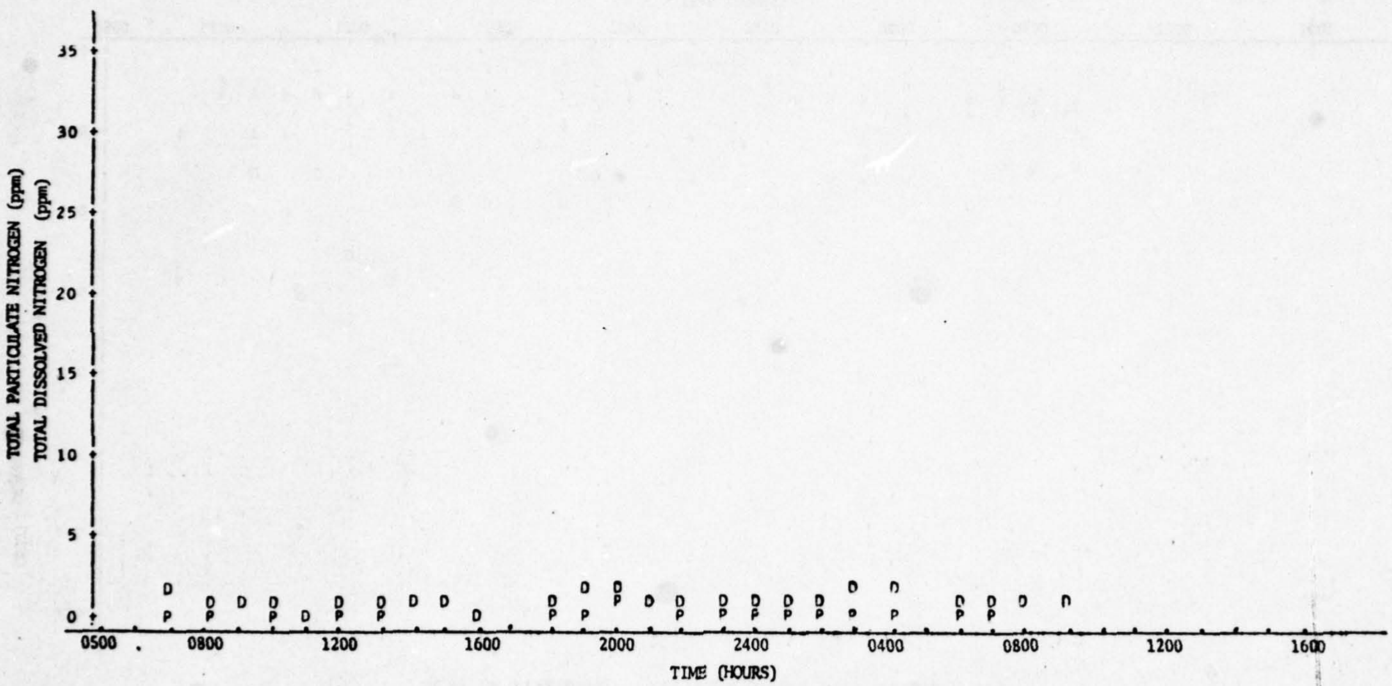
1 - 2 November 1977

PLOT OF TIME*TPHOS LEGEND: SYMBOL USED IS CHARACTER T
PLOT OF TIME*PPHOS LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*OPHOS. LEGEND: SYMBOL USED IS CHARACTER O

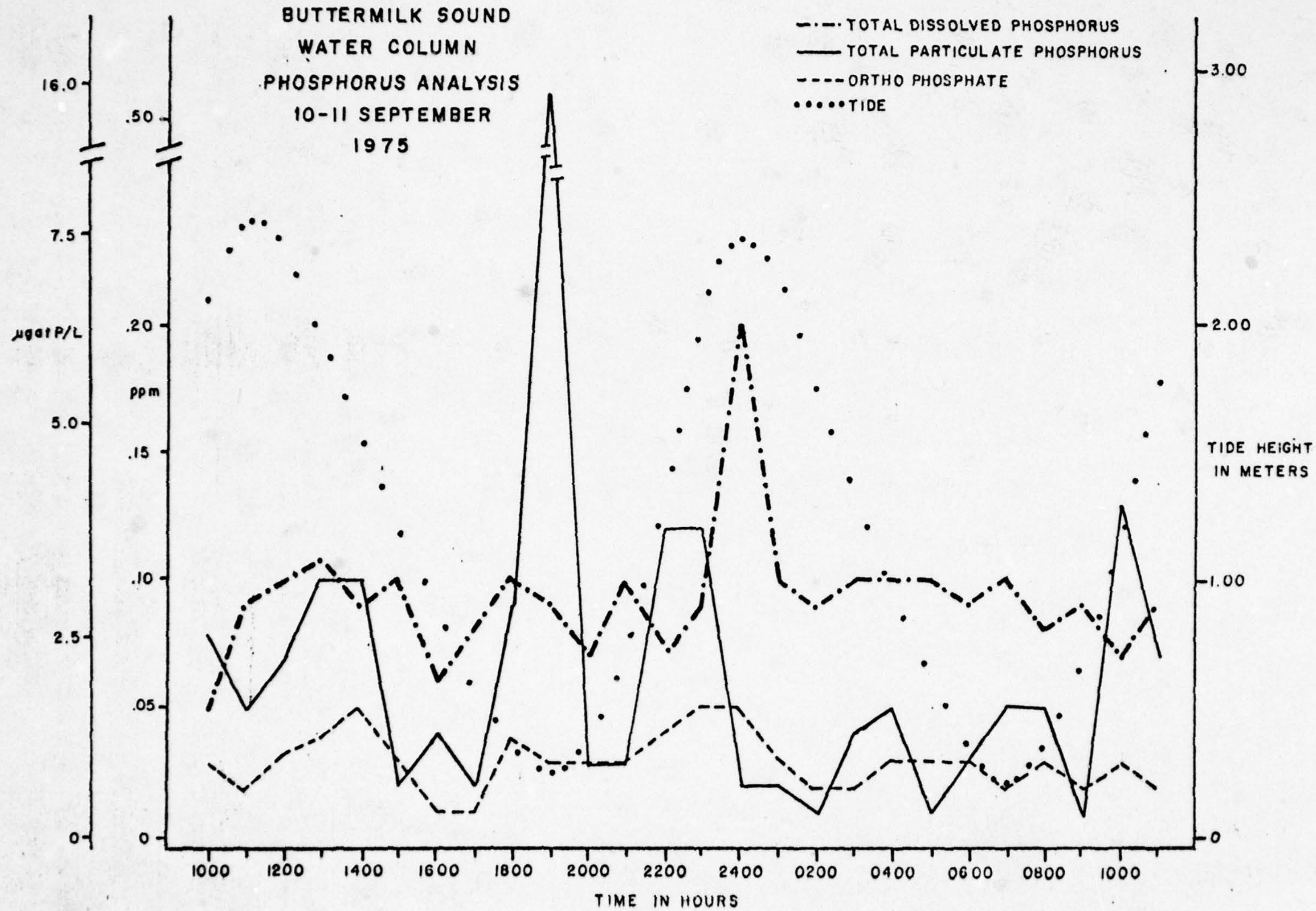


1 - 2 November 1977

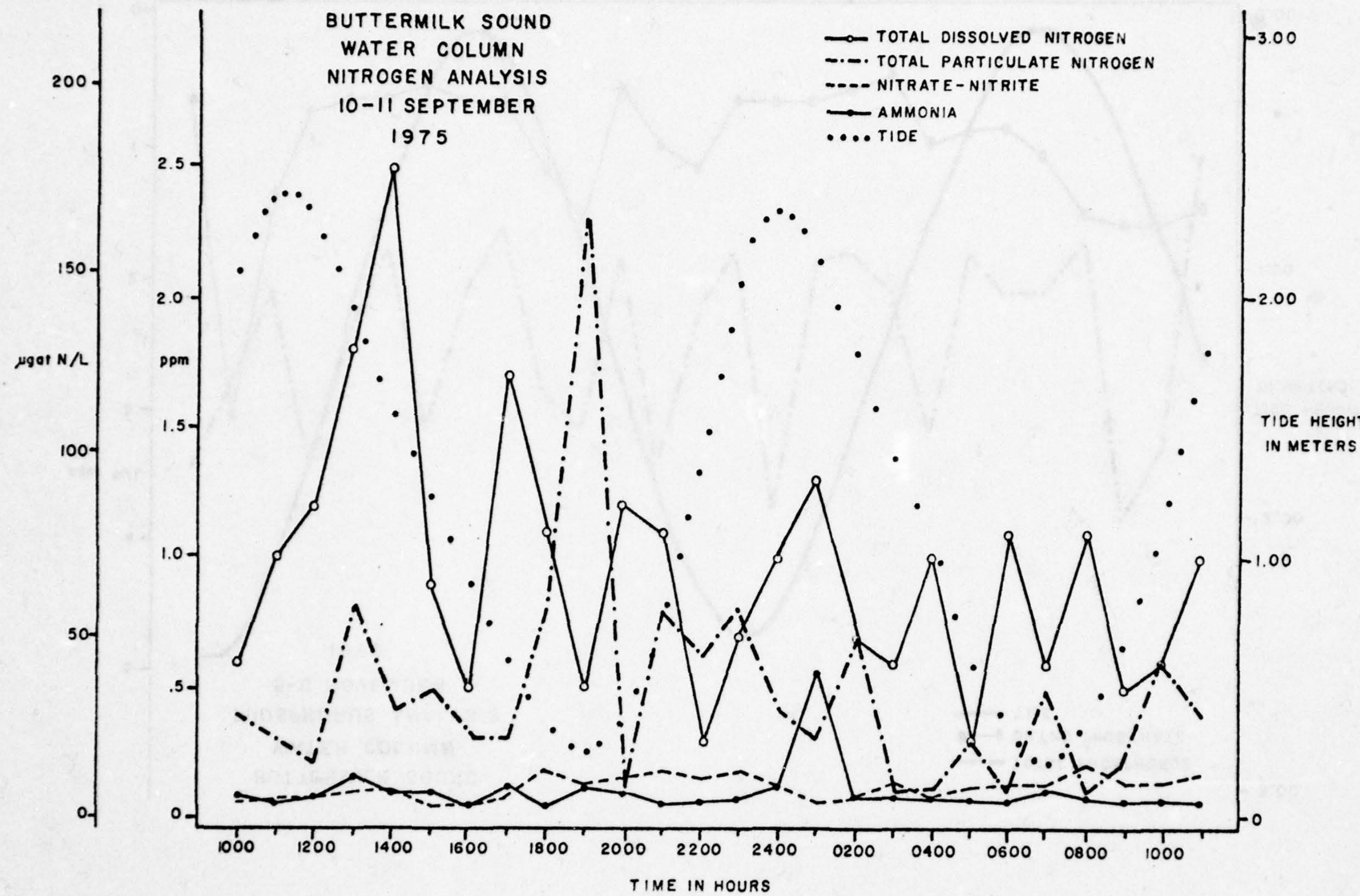
PLOT OF TIME*PNIT LEGEND: SYMBOL USED IS CHARACTER P
PLOT OF TIME*DNIT LEGEND: SYMBOL USED IS CHARACTER D



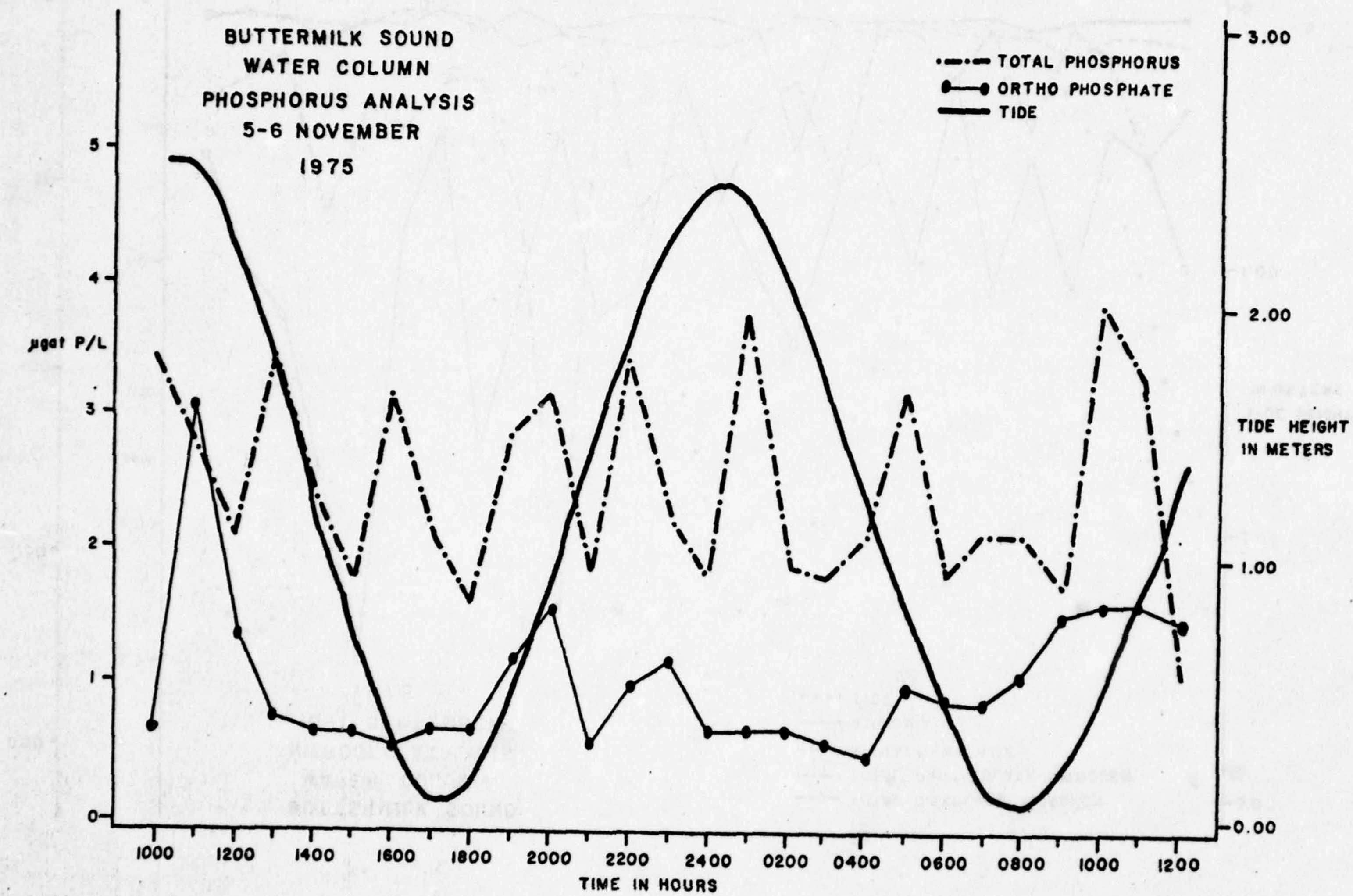
PART 4


BUTTERMILK SOUND
WATER COLUMN
PHOSPHORUS ANALYSIS
10-11 SEPTEMBER
1975
TOTAL DISSOLVED PHOSPHORUS
TOTAL PARTICULATE PHOSPHORUS
ORTHO PHOSPHATE
TIDE
16.0
7.5
µgat P/L
5.0
2.5
0
.50
.20
ppm
.15
.10
.05
0
3.00
2.00
TIDE HEIGHT
IN METERS
1.00
0
1000
1200
1400
1600
1800
2000
2200
2400
0200
0400
0600
0800
1000
TIME IN HOURS

A210

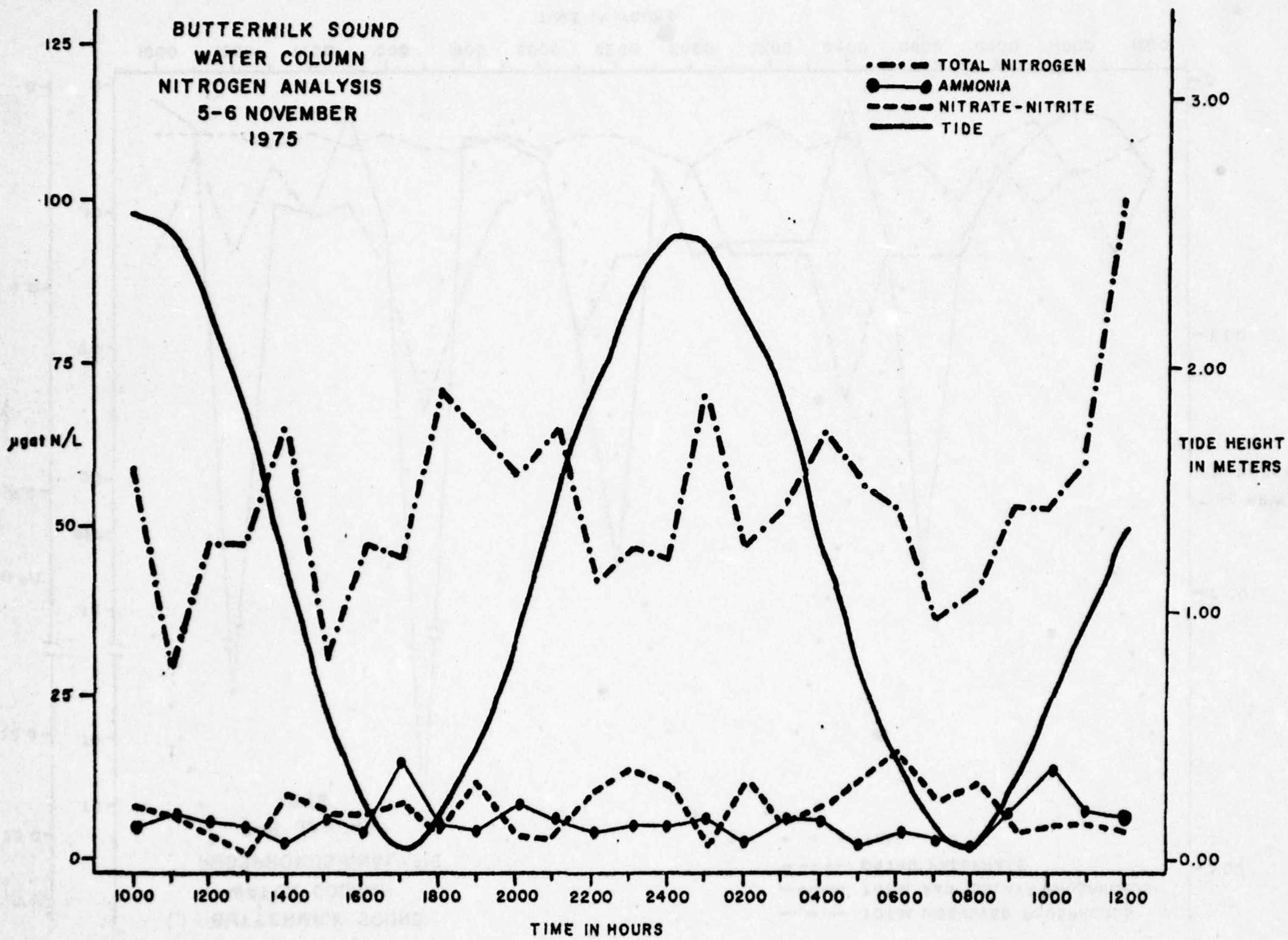

BUTTERMILK SOUND
WATER COLUMN
NITROGEN ANALYSIS
10-11 SEPTEMBER
1975
TOTAL DISSOLVED NITROGEN
TOTAL PARTICULATE NITROGEN
NITRATE-NITRITE
AMMONIA
TIDE
µgat N/L
ppm
TIDE HEIGHT IN METERS
TIME IN HOURS
200
150
100
50
0
2.5
2.0
1.5
1.0
.5
0
3.00
2.00
1.00
0
1000
1200
1400
1600
1800
2000
2200
2400
0200
0400
0600
0800
1000

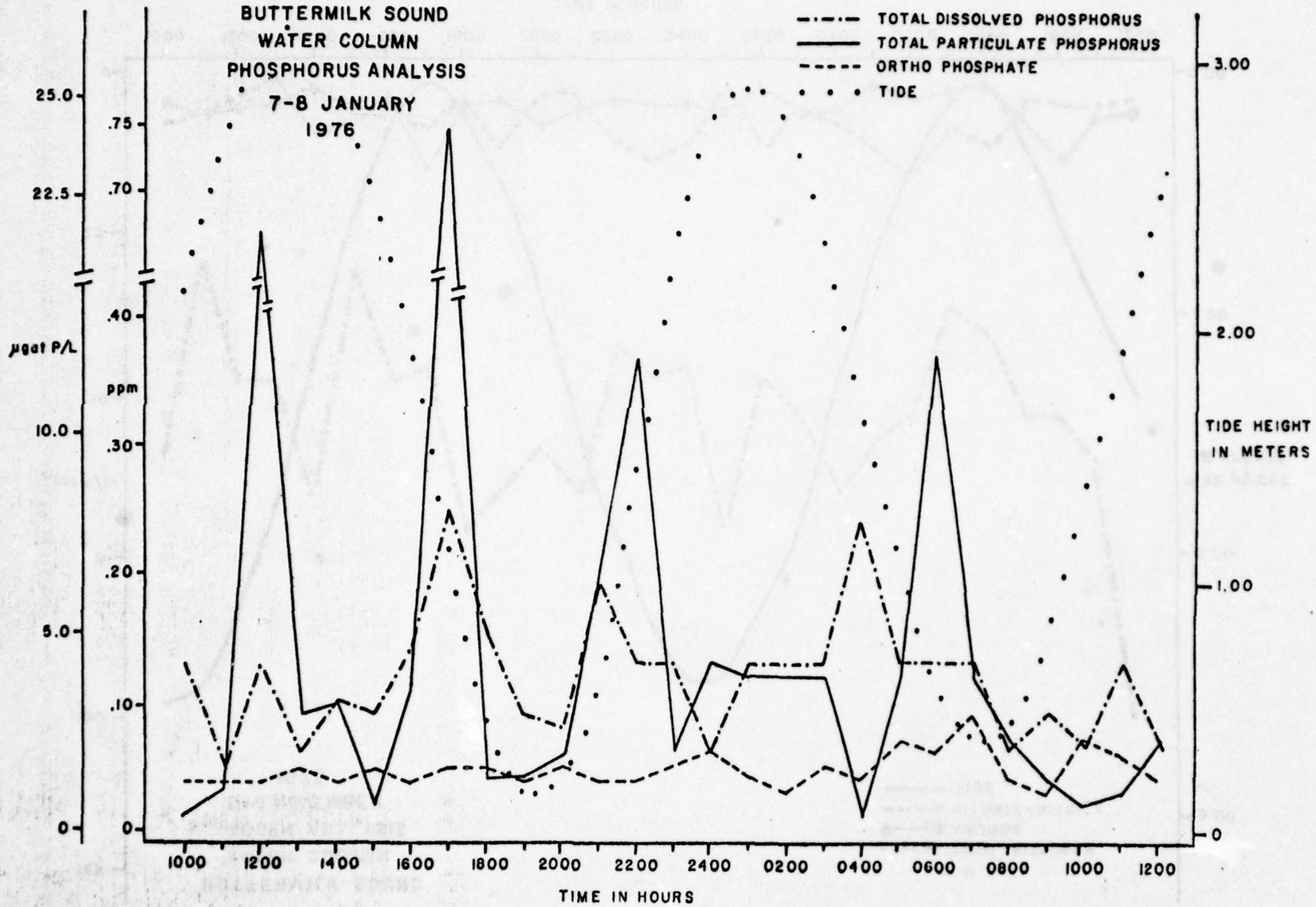
A211



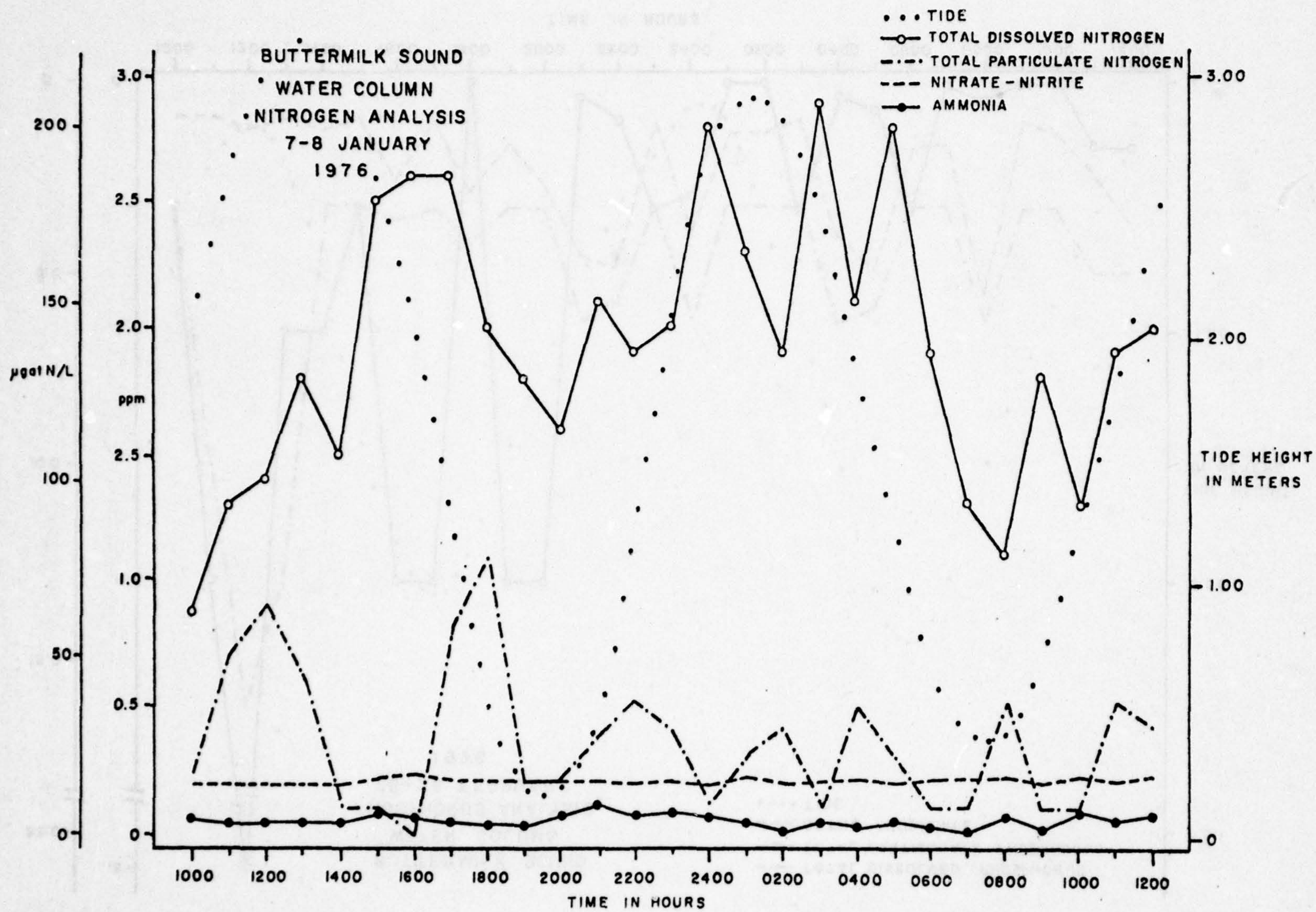
BUTTERMILK SOUND
WATER COLUMN
PHOSPHORUS ANALYSIS
5-6 NOVEMBER
1975
TOTAL PHOSPHORUS
ORTHO PHOSPHATE
TIDE
µgat P/L
TIDE HEIGHT IN METERS
TIME IN HOURS
5
4
3
2
1
0
3.00
2.00
1.00
0.00
1000
1200
1400
1600
1800
2000
2200
2400
0200
0400
0600
0800
1000
1200

A212


BUTTERMILK SOUND
WATER COLUMN
NITROGEN ANALYSIS
5-6 NOVEMBER
1975
TOTAL NITROGEN
AMMONIA
NITRATE-NITRITE
TIDE
µgat N/L
125
100
75
50
25
0
TIDE HEIGHT
IN METERS
3.00
2.00
1.00
0.00
1000
1200
1400
1600
1800
2000
2200
2400
0200
0400
0600
0800
1000
1200
TIME IN HOURS

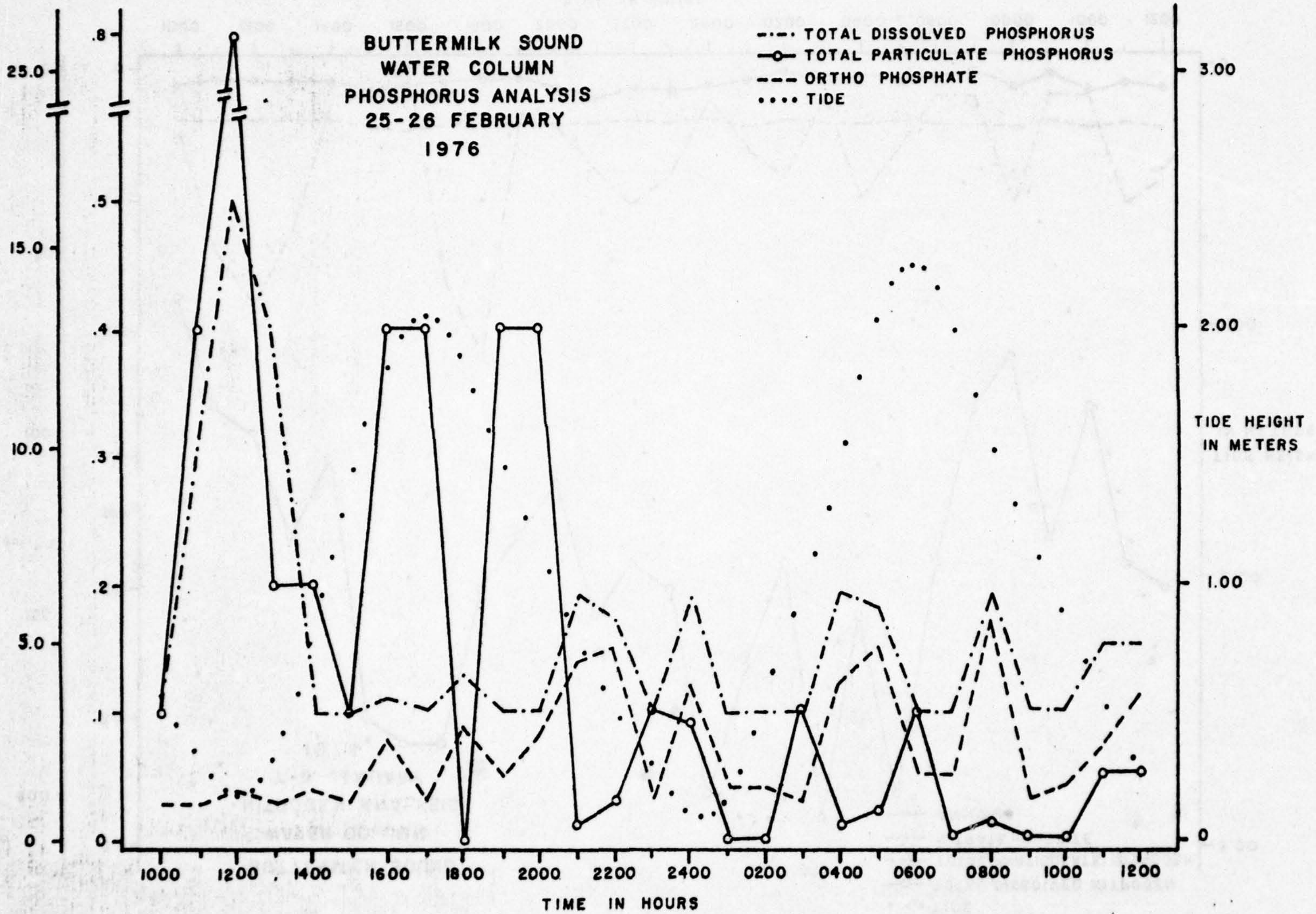

BUTTERMILK SOUND
WATER COLUMN
PHOSPHORUS ANALYSIS
7-8 JANUARY
1976
TOTAL DISSOLVED PHOSPHORUS
TOTAL PARTICULATE PHOSPHORUS
ORTHO PHOSPHATE
TIDE
µgat P/L
ppm
25.0
22.5
10.0
5.0
0
.75
.70
.40
.30
.20
.10
0
3.00
2.00
1.00
0
TIDE HEIGHT
IN METERS
1000
1200
1400
1600
1800
2000
2200
2400
0200
0400
0600
0800
1000
1200
TIME IN HOURS

A214

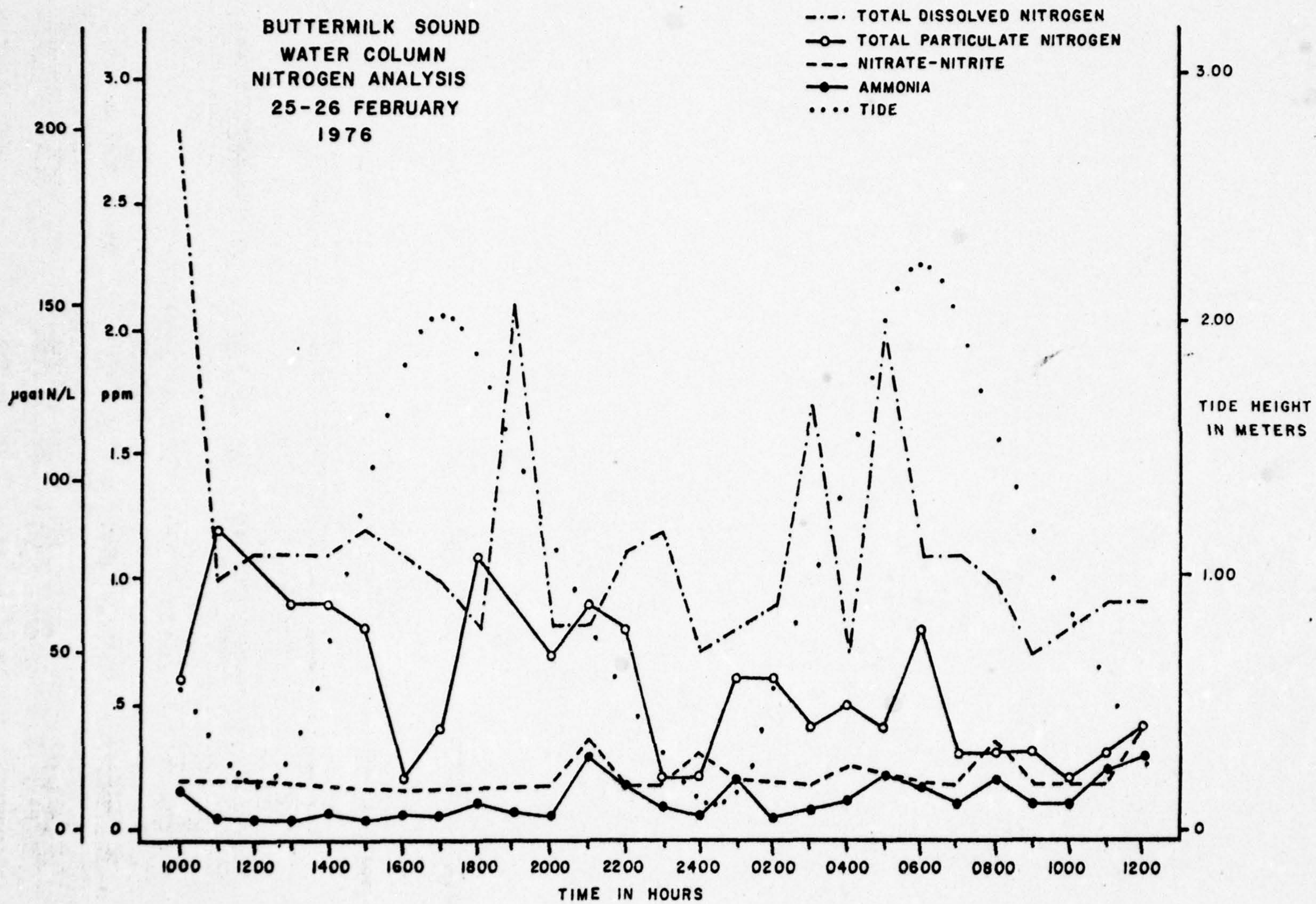


BUTTERMILK SOUND
WATER COLUMN
NITROGEN ANALYSIS
7-8 JANUARY
1976
TIDE
TOTAL DISSOLVED NITROGEN
TOTAL PARTICULATE NITROGEN
NITRATE - NITRITE
AMMONIA
µgat N/L
ppm
TIDE HEIGHT IN METERS
TIME IN HOURS

A215


BUTTERMILK SOUND
WATER COLUMN
PHOSPHORUS ANALYSIS
25-26 FEBRUARY
1976
TOTAL DISSOLVED PHOSPHORUS
TOTAL PARTICULATE PHOSPHORUS
ORTHO PHOSPHATE
TIDE
25.0
15.0
10.0
5.0
0
.8
.5
.4
.3
.2
.1
0
3.00
2.00
1.00
0
TIDE HEIGHT
IN METERS
1000
1200
1400
1600
1800
2000
2200
2400
0200
0400
0600
0800
1000
1200
TIME IN HOURS

A216


BUTTERMILK SOUND
WATER COLUMN
NITROGEN ANALYSIS
25-26 FEBRUARY
1976
TOTAL DISSOLVED NITROGEN
TOTAL PARTICULATE NITROGEN
NITRATE-NITRITE
AMMONIA
TIDE
μgat N/L
ppm
TIDE HEIGHT
IN METERS
TIME IN HOURS
0
50
100
150
200
.5
1.0
1.5
2.0
2.5
3.0
1.00
2.00
3.00
1000
1200
1400
1600
1800
2000
2200
2400
0200
0400
0600
0800

A217

APPENDIX B

INTERSTITIAL WATER CHEMISTRY

PARTS 1-4

Analysis of Variance
General Linear Model
Significance Denoted by Duncan's Multiple
Range Test

Legend for Variable Codes

REDOX	=	Redox potential (millivolts).
pH	=	Hydrogen ion concentration.
TPHOS	=	Total phosphorus (ppm).
PPHOS	=	Total particulate phosphorus (ppm).
NITA	=	Nitrate and Nitrite Nitrogen (ppm).
DOC	=	Dissolved organic carbon (ppm).
TDC	=	Total dissolved carbon (ppm).
TOC	=	Total organic carbon (ppm).
DPHOS	=	Total dissolved phosphorus (ppm).
TNIT	=	Total nitrogen (ppm).
OPHOS	=	Orthophosphate (ppm).
PNIT	=	Total particulate nitrogen (ppm).
DNIT	=	Total dissolved Nitrogen (ppm).
AMMO	=	Ammona Nitrogen (ppm).

PART 1
Analysis of Variance Among Species by Year

PART 2
Analysis of Variance Among Zones and fertilizer treatments by year

Part 3

Analysis of Variance
Control Areas versus Experimental plots

Legend for Control Levels

0 = Experimental plots
1 = Surrounding tidal Waters
2 = Adjacent *S. alterniflora* marshes
3 = Ground water runoff

PART 4

Analysis of Variance
Time replicated study by time and zone

PART 5

Chemical and Physical Parameters versus Sampling date
Plots for each zone
All plots sampled

PART 6

Chemical and Physical Parameters versus Sampling date
Plots for each zone
Only S. alterniflora plots

PART 7

Chemical and Physical Parameters versus Sampling date
Plots for each species
Only upper third of intertidal zone.

PART 1

YR=76

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
SPECIE	3	2 5 7
FERT	5	1 2 3 4 5

NUMBER OF OBSERVATIONS IN BY GROUP = 139

GROUP	OBS	DEPENDENT VARIABLES
1	137	AMMO OPHOS
2	114	OPHOS PPHOS TPHOS
3	134	EH
4	135	PH

NOTE: VARIABLES IN EACH GROUP ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES.

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YR=76

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: AMMO

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	14	2.46880894	0.17634350	1.21	0.2733	0.122336	303.4007
ERROR	122	17.71174434	0.14517823		STD DEV		AMMO MEAN
CORRECTED TOTAL	136	20.18055328			0.38102261		0.12558394

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
SPECIE	2	0.38358052	1.32	0.2706	2	0.44217013	1.52	0.2222
FERT	4	0.56503418	0.97	0.4249	4	0.65857797	1.13	0.3437
SPECIE*FERT	8	1.52019424	1.31	0.2453	8	1.52019424	1.31	0.2453

YR=76

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: OPHOS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	14	0.12372513	0.00883751	0.51	0.9226	0.055460	107.9104
ERROR	122	2.10716173	0.01727182		STD DEV		OPHOS MEAN
CORRECTED TOTAL	136	2.23088686			0.13142229		0.12173832

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
SPECIE	2	0.03272335	0.95	0.3906	2	0.03054373	0.88	0.4157
FERT	4	0.04321681	0.63	0.6452	4	0.04726679	0.68	0.6042
SPECIE*FERT	8	0.04778497	0.35	0.9461	8	0.04778497	0.35	0.9461

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE AMMO

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=122   MS=0.145178

GROUPING	MEAN	N	SPECIE
A	0.202500	44	7
A			
A	0.090326	46	2
A			
A	0.088085	47	5

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   21:18 SATURDAY, MARCH 4, 1978   5

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE CPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=122   MS=.0172718

GROUPING	MEAN	N	SPECIE
A	0.136250	44	7
A			
A	0.129149	47	5
A			
A	0.100435	46	2

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE AMMO

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=122   MS=0.145178

GROUPING	MEAN	N	FERT
A	0.248148	27	4
A	0.119167	30	3
A	0.094815	27	5
A	0.092222	27	1
A	0.072308	26	2

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE UPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=122   MS=.0172718

GROUPING	MEAN	N	FERT
A	0.150500	30	3
A	0.126296	27	1
A	0.117037	27	4
A	0.108846	26	2
A	0.102593	27	5

YR=76

GENERAL LINEAR MODELS PROCEDURE

MEANS

SPECIE	FERT	N	AMMO	OPHOS
2	1	10	0.09800000	0.13900000
2	2	7	0.09857143	0.09300000
2	3	11	0.09954545	0.10318182
2	4	9	0.07777778	0.08944444
2	5	9	0.07666667	0.07333333
5	1	7	0.13142857	0.11000000
5	2	10	0.05700000	0.11000000
5	3	9	0.10111111	0.16000000
5	4	10	0.07700000	0.12700000
5	5	11	0.08818182	0.13545455
7	1	10	0.05900000	0.12500000
7	2	9	0.06888889	0.12222222
7	3	10	0.15700000	0.19400000
7	4	8	0.65375000	0.13562500
7	5	7	0.12857143	0.08857143

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YR=76

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: DPHOS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	14	1.50499575	0.10749970	1.31	0.2165	0.156070	157.8984
ERROR	99	8.13817004	0.08220273		STD DEV		DPHOS MEAN
CORRECTED TOTAL	113	9.64306579			0.28671018		0.18157895

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
SPECIE	2	0.11779721	0.72	0.4910	2	0.18850152	1.15	0.3219
FERT	4	0.35662070	1.08	0.3684	4	0.46845625	1.42	0.2314
SPECIE*FERT	8	1.03057784	1.57	0.1444	8	1.03057784	1.57	0.1444

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YR=76

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: PPHOS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	14	3.69609192	0.26400657	1.18	0.3062	0.142502	163.6390
ERROR	99	22.24094405	0.22465600		STD DEV		PPHOS MEAN
CORRECTED TOTAL	113	25.93703596			0.47397890		0.28964912

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
SPECIE	2	0.36830624	0.82	0.4435	2	0.35762671	0.80	0.4540
FERT	4	1.01344850	1.13	0.3479	4	1.28453407	1.43	0.2299
SPECIE*FERT	8	2.31433719	1.29	0.2586	8	2.31433719	1.29	0.2586

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YR=76

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: TPHOS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	14	5.01468519	0.35819180	1.00	0.4624	0.123571	128.6083
ERROR	99	35.56663849	0.35925897		STD DEV		TPHOS MEAN
CORRECTED TOTAL	113	40.58132368			0.59938216		0.46605263

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
SPECIE	2	0.07011051	0.10	0.9071	2	0.03546281	0.05	0.9519
FERT	4	0.90672076	0.63	0.6416	4	1.22580999	0.85	0.4951
SPECIE*FERT	8	4.03785392	1.40	0.2038	8	4.03785392	1.40	0.2038

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE OPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=99   MS=.0822027

GROUPING	MEAN	N	SPECIE
A	0.225676	37	7
A			
A	0.172973	37	5
A			
A	0.148750	40	2

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE PPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=99 MS=0.224656

GROUPING	MEAN	N	SPECIE
A	0.352500	40	2
A			
A	0.296757	37	5
A			
A	0.214595	37	7

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE TPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=99   MS=0.359259

GROUPING	MEAN	N	SPECIE
A	0.473750	40	2
A			
A	0.468649	37	5
A			
A	0.433514	37	7

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE DPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=99   MS=.0822027

GROUPING	MEAN	N	FERT
A	0.294524	21	5
A	0.175200	25	3
A	0.157826	23	2
A	0.150682	22	4
A	0.138696	23	1

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE FPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=99   MS=0.224656

GROUPING	MEAN	N	FERT
A	0.456957	23	1
A			
A	0.318800	25	3
A			
A	0.241304	23	2
A			
A	0.226905	21	5
A			
A	0.192045	22	4

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE TPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=99   MS=0.359259

GROUPING	MEAN	N	FERT
A	0.589130	23	1
A	0.526190	21	5
A	0.482000	25	3
A	0.393043	23	2
A	0.338182	22	4

AD-A062 867 GEORGIA UNIV BRUNSWICK MARINE EXTENSION SERVICE F/G 13/2
HABITAT DEVELOPMENT FIELD INVESTIGATIONS BUTTERMILK SOUND MARSH--ETC(U)
JUL 78 R J REIMOLD, M A HARDISKY, P C ADAMS DACW21-75-C-0074
UNCLASSIFIED WES-TR-D-78-26-APP-A NL

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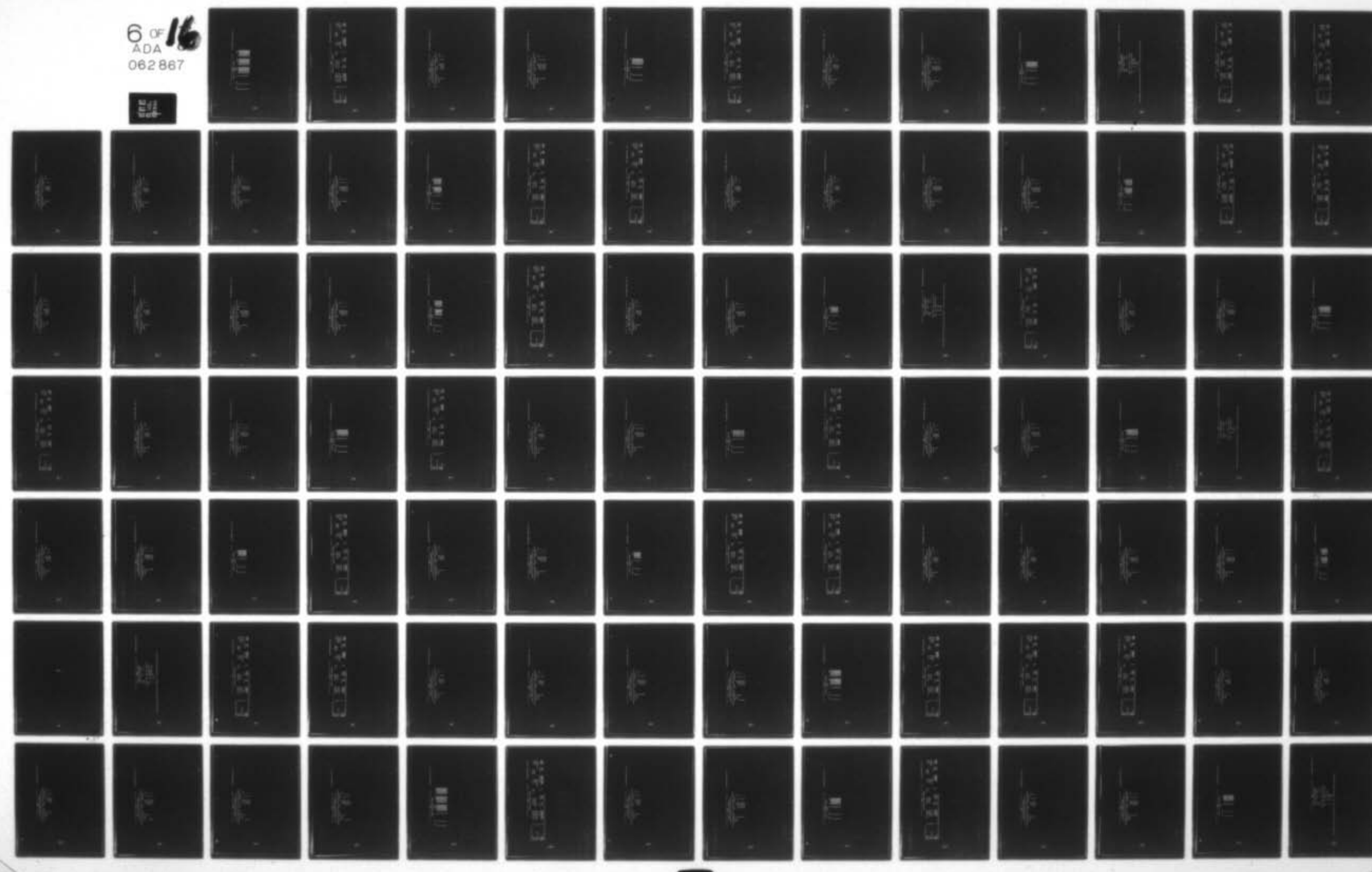

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1·0 2·8 2·5 3·15 2·2 3·5 2·0 4·0 1·1 4·5 1·8 1·25 1·4 1·6

YR=76

GENERAL LINEAR MODELS PROCEDURE

MEANS

SPECIE	FERT	N	DPHOS	PPHOS	TPHOS
2	1	9	0.14444444	0.46666667	0.61111111
2	2	7	0.12857143	0.29285714	0.42142857
2	3	9	0.15888889	0.44666667	0.57222222
2	4	8	0.13375000	0.24250000	0.38125000
2	5	7	0.17285714	0.27000000	0.44285714
5	1	6	0.14500000	0.91333333	1.05833333
5	2	8	0.20250000	0.17625000	0.36125000
5	3	8	0.19750000	0.19000000	0.38750000
5	4	7	0.18571429	0.18571429	0.37142857
5	5	8	0.12875000	0.15875000	0.30000000
7	1	8	0.12750000	0.10375000	0.21250000
7	2	8	0.13875000	0.26125000	0.40000000
7	3	8	0.17125000	0.30375000	0.47500000
7	4	7	0.12928571	0.14071429	0.25571429
7	5	6	0.65750000	0.26750000	0.92500000

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YR=76

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: EH

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	14	34093.03347171	2435.21667655	0.38	0.9781	0.042870	17.7808
ERROR	119	761165.07287158	6396.34515018		STD DEV		EH MEAN
CORRECTED TOTAL	133	795258.10634329			79.97715393		449.79477612

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
SPECIE	2	1046.92757685	0.03	0.9215	2	533.05497397	0.04	0.9592
FERT	4	7657.49319912	0.31	0.8727	4	10318.86579135	0.40	0.8059
SPECIE*FERT	8	25188.61269574	0.49	0.8597	8	25188.61269574	0.49	0.8597

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE EH

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=119   MS=6396.35

GROUPING	MEAN	N	SPECIE
A	451.866667	45	5
A			
A	451.565217	46	2
A			
A	445.732558	43	7

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE EH

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=119   MS=6396.35

GROUPING	MEAN	N	FERT
A	460.482759	29	3
A	454.884615	26	4
A	448.519231	26	2
A	446.055556	27	5
A	437.942308	26	1

YR=76

GENERAL LINEAR MODELS PROCEDURE

MEANS

SPECIE	FERT	N	EH
2	1	11	453.545455
2	2	7	421.142857
2	3	11	454.000000
2	4	8	449.125000
2	5	9	472.000000
5	1	5	418.000000
5	2	10	460.500000
5	3	9	461.555556
5	4	10	469.000000
5	5	11	435.909091
7	1	10	430.750000
7	2	9	456.500000
7	3	9	467.333333
7	4	8	443.000000
7	5	7	428.642857

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YR=76

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: PH

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	14	1.42824357	0.10201740	0.42	0.9664	0.046571	6.9488
ERROR	120	24.23990458	0.24366597		STD DEV		PH MEAN
CORRECTED TOTAL	134	30.66814815			0.49362523		7.10370370

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
SPECIE	2	0.35274875	0.72	0.4870	2	0.42150631	0.86	0.4237
FERT	4	0.14085682	0.14	0.9651	4	0.12235195	0.13	0.9730
SPECIE*FERT	8	0.93463799	0.48	0.8687	8	0.93463799	0.48	0.8687

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE PH

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=120 MS=0.243666

GROUPING	MEAN	N	SPECIE
A	7.141304	46	5
A	7.139535	43	7
A	7.032609	46	2

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YR=76

GENEPAL LINEAR MODELS PROCEDURE

DUNCAN'S PLLTIPLE RANGE TEST FOP VARIABLE PH

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=120   MS=0.243666

GROUPING	MEAN	N	FERT
A	7.146552	29	3
A	7.126923	26	4
A	7.096296	27	1
A	7.076923	26	2
A	7.068519	27	5

YR=76

GENERAL LINEAR MODELS PROCEDURE

MEANS

SPECIE	FERT	N	PH
2	1	11	7.10909091
2	2	7	7.04285714
2	3	11	7.06818182
2	4	8	6.86875000
2	5	9	7.03333333
5	1	6	7.20000000
5	2	10	6.99000000
5	3	9	7.16666667
5	4	10	7.29000000
5	5	11	7.09090909
7	1	10	7.02000000
7	2	9	7.20000000
7	3	9	7.22222222
7	4	8	7.18125000
7	5	7	7.07857143

YR=77

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
SPECIE	3	2 5 7
FERT	5	1 2 3 4 5

NUMBER OF OBSERVATIONS IN BY GROUP = 40

GROUP	OBS	DEPENDENT VARIABLES
1	40	AMMO OPHOS
2	19	DPHOS PPHOS
3	23	EH PH
4	23	TPHOS

NOTE: VARIABLES IN EACH GROUP ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES.

YR=77

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: AMMO

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	9	0.30939083	0.03437676	0.42	0.9145	0.111690	81.6526
ERROR	30	2.46068667	0.08202289		STD DEV		AMMO MEAN
CORRECTED TOTAL	39	2.77007750			0.28639638		0.35075000

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
SPECIE	2	0.01966708	0.12	0.8874	2*	0.14246876	0.87	0.4299
FERT	4	0.13504212	0.41	0.7989	4*	0.25428535	0.78	0.5501
SPECIE*FERT	3	0.15468163	0.63	0.6022	3	0.15468163	0.63	0.6022

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

YR=77

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: OPHOS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	9	0.29126104	0.03236234	0.19	0.9936	0.053933	103.7214
ERROR	30	5.10918333	0.17030611		STD DEV		OPHOS MEAN
CORRECTED TOTAL	39	5.40044437			0.41268161		0.39787500

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
SPECIE	2	0.13875010	0.41	0.6690	2*	0.08127247	0.24	0.7892
FERT	4	0.05917197	0.09	0.9859	4*	0.12723069	0.19	0.9435
SPECIE*FERT	3	0.09333896	0.18	0.9073	3	0.09333896	0.18	0.9073

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE AMMO

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=30   MS=.0820229

GROUPING	MEAN	N	SPECIE
A	0.381667	12	5
A			
A	0.346875	16	7
A			
A	0.325000	12	2

VR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE OPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=30   MS=0.170306

GROUPING	MEAN	N	SPECIE
A	0.470833	12	2
A	0.414167	12	5
A	0.330937	16	7

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE AMMO

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=30 MS=.0820229

GROUPING	MEAN	N	FERT
A	0.386923	13	2
A	0.368333	6	3
A	0.361667	6	4
A	0.358333	6	1
A	0.274444	9	5

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE OPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=30 MS=0.170306

GROUPING	MEAN	N	FERT
A	0.486667	6	1
A	0.399231	13	2
A	0.397500	6	4
A	0.381667	6	3
A	0.347778	9	5

GENERAL LINEAR MODELS PROCEDURE

MEANS

SPECIE	FERT	N	AMMO	OPHOS
2	1	6	0.35833333	0.48666667
2	2	2	0.39000000	0.57500000
2	4	3	0.30000000	0.47333333
2	5	1	0.07000000	0.16000000
5	2	6	0.38000000	0.41500000
5	5	6	0.38333333	0.41333333
7	2	5	0.39400000	0.31000000
7	3	6	0.36833333	0.38166667
7	4	3	0.42333333	0.32166667
7	5	2	0.05000000	0.24500000

YR=77

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: DPHOS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	8	1.02254912	0.12781864	0.25	0.9677	0.169238	108.5145
ERROR	10	5.01951667	0.50195167		STD DEV		DPHOS MEAN
CORRECTED TOTAL	18	6.04206579			0.70848547		0.65289474

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
SPECIE	2	0.01911023	0.02	0.9812	2*	0.51636135	0.51	0.6129
FERT	4	0.97122935	0.48	0.7477	4*	0.39534635	0.20	0.9344
SPECIE*FERT	2	0.03220954	0.03	0.9685	2	0.03220954	0.03	0.9685

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

YR=77

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: PPHOS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	8	1.85857895	0.23232237	1.12	0.4231	0.473279	184.8394
ERROR	10	2.06845000	0.20684500		STD DEV		PPHOS MEAN
CORRECTED TOTAL	18	3.92702895			0.45480215		0.24605263

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
SPECIE	2	0.60434895	1.46	0.2776	2*	0.16015492	0.39	0.6887
FERT	4	1.02968472	1.24	0.3531	4*	0.70462969	0.85	0.5242
SPECIE*FERT	2	0.22454528	0.54	0.5973	2	0.22454528	0.54	0.5973

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE DPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=10 MS=0.501952

GROUPING	MEAN	N	SPECIE
A	0.704000	5	5
A			
A	0.648000	5	2
A			
A	0.627222	9	7

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE PPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=10 MS=0.206845

GROUPING	MEAN	N	SPECIF
A	0.431667	9	7
A			
A	0.118000	5	2
A			
A	0.040000	5	5

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE DPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=10   MS=0.501952

GROUPING	MEAN	N	FERT
A	0.950000	2	1
A	0.843333	3	4
A	0.614000	5	5
A	0.595000	3	3
A	0.520000	6	2

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE PPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=10 MS=0.206845

GROUPING		MEAN	N	FERT
	A	0.841667	3	3
B	A	0.263333	3	4
B	A	0.250000	5	5
B		0.018333	6	2
B		0.000000	2	1

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   21:18 SATURDAY, MARCH 4, 1978   41

YR=77

GENERAL LINEAR MODELS PROCEDURE

MEANS

SPECIE	FERT	N	DPHOS	PPHOS
2	1	2	0.95000000	0.00000000
2	2	1	0.91000000	0.30000000
2	4	2	0.66500000	0.29500000
5	2	2	0.80000000	0.05000000
5	5	3	0.64000000	0.03333333
7	2	3	0.50333333	0.00333333
7	3	3	0.59500000	0.84166667
7	4	1	1.20000000	0.20000000
7	5	2	0.57500000	0.57500000

YR=77

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: EH

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	8	72205.72826087	9025.71603261	0.37	0.9177	0.175853	32.2816
ERROR	14	338397.75000000	24171.26785714		STD DEV		EH MEAN
CORRECTED TOTAL	22	410603.47826087			155.47111583		481.60869565

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
SPECIE	2	8487.18778468	0.13	0.8408	2*	48622.01044386	1.01	0.3907
FERT	4	44684.95823076	0.46	0.7624	4*	44124.87022472	0.46	0.7664
SPECIE*FERT	2	19033.58224543	0.39	0.6818	2	19033.58224543	0.39	0.6818

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

YR=77

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: PH

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	8	1.29329710	0.16166214	0.58	0.7788	0.248753	8.0294
ERROR	14	3.90583333	0.27898810		STD DEV		PH MEAN
CORRECTED TOTAL	22	5.19913043			0.52819324		6.57826087

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
SPECIE	2	0.14222567	0.25	0.7785	2*	0.03391210	0.06	0.9413
FERT	4	0.98368675	0.83	0.4998	4*	0.79969476	0.72	0.5944
SPECIE*FERT	2	0.16738468	0.30	0.7455	2	0.16738468	0.30	0.7455

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE EH

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=14   MS=24171.3

GROUPING	MEAN	N	SPECIE
A	508.333333	6	2
A			
A	482.700000	10	7
A			
A	457.142857	7	5

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   21:18 SATURDAY, MARCH 4, 1978   45

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE PH

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=14   MS=0.278988

GROUPING	MEAN	N	SPECIE
A	6.685714	7	5
A			
A	6.583333	6	2
A			
A	6.500000	10	7

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE EH

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=14 MS=24171.3

GROUPING	MEAN	N	FERT
A	542.333333	3	4
A	497.857143	7	2
A	477.200000	5	5
A	461.750000	4	3
A	450.500000	4	1

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE PH

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=14 MS=0.278988

GROUPING	MEAN	N	FERT
A	6.800000	7	2
A	6.660000	5	5
A	6.625000	4	1
A	6.350000	4	3
A	6.166667	3	4

YR=77

GENERAL LINEAR MODELS PROCEDURE

MEANS

SPECIE	FERT	N	EH	PH
2	1	4	450.500000	6.62500000
2	2	1	619.000000	6.60000000
2	4	1	629.000000	6.40000000
5	2	3	476.000000	6.73333333
5	5	4	443.000000	6.65000000
7	2	3	456.000000	6.93333333
7	3	4	461.750000	6.35000000
7	4	2	499.000000	6.35000000
7	5	1	614.000000	6.70000000

YR=77

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: TPHOS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	9	2.87063170	0.31339908	0.50	0.8524	0.255640	100.6968
ERROR	13	8.35857917	0.64296763		STD DEV		TPHOS MEAN
CORRECTED TOTAL	22	11.22921087			0.80185262		0.79630435

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
SPECIE	2	0.74686218	0.58	0.5733	2*	0.47488207	0.37	0.6982
FERT	4	1.44407457	0.56	0.6948	4*	0.89131975	0.35	0.8417
SPECIE*FERT	3	0.67969495	0.35	0.7882	3	0.67969495	0.35	0.7882

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE TPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=13 MS=0.642968

GROUPING	MEAN	N	SPECIE
A	0.999500	10	7
A			
A	0.678333	6	5
A			
A	0.607143	7	2

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE TPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=13   MS=0.642968

GROUPING	MEAN	N	FERT
A	1.436667	3	3
A	0.946250	4	4
A	0.731667	6	5
A	0.683333	3	1
A	0.540000	7	2

YR=77

GENERAL LINEAR MODELS PROCEDURE

MEANS

SPECIE	FERT	N	TPHOS
2	1	3	0.68333333
2	2	1	0.01000000
2	4	2	0.96000000
2	5	1	0.27000000
5	2	3	0.75000000
5	5	3	0.60666667
7	2	3	0.50666667
7	3	3	1.43666667
7	4	2	0.93250000
7	5	2	1.15000000

YR=76

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
SPECIE	3	2 5 7
FERT	5	1 2 3 4 5

NUMBER OF OBSERVATIONS IN BY GROUP = 139

GROUP	OBS	DEPENDENT VARIABLES
1	137	NITA
2	122	TNIT
3	124	DNIT
4	116	PNIT

NOTE: VARIABLES IN EACH GROUP ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES.

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YR=76

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: NITA

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	14	2.94671430	0.21047959	0.71	0.7576	0.075656	115.5628
ERROR	122	36.00198497	0.29509824		STD DEV		NITA MEAN
CORRECTED TOTAL	136	38.94869927			0.54322945		0.47007299

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
SPECIE	2	0.36765029	0.62	0.5381	2	0.30906160	0.52	0.5937
FERT	4	0.64234520	0.54	0.7036	4	0.63342870	0.54	0.7091
SPECIE*FERT	8	1.93671882	0.82	0.5861	8	1.93671882	0.82	0.5861

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE NITA

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=122   MS=0.295098

GROUPING	MEAN	N	SPECIE
A	0.538511	47	5
A			
A	0.452935	46	2
A			
A	0.414886	44	7

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE NITA

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=122 MS=0.295098

GROUPING	MEAN	N	FERT
A	0.573519	27	4
A	0.539259	27	5
A	0.431500	30	3
A	0.429808	26	2
A	0.379074	27	1

YR=76

GENERAL LINEAR MODELS PROCEDURE

MEANS

SPECIE	FERT	N	NITA
2	1	10	0.30000000
2	2	7	0.45142857
2	3	11	0.39045455
2	4	9	0.55333333
2	5	9	0.60000000
5	1	7	0.47285714
5	2	10	0.44100000
5	3	9	0.62888889
5	4	10	0.43100000
5	5	11	0.69272727
7	1	10	0.39250000
7	2	9	0.40055556
7	3	10	0.29900000
7	4	8	0.77437500
7	5	7	0.22000000

YR=76

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: TNIT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	14	22.15529411	1.58252101	1.01	0.4498	0.116650	65.3495
ERROR	107	167.77479524	1.56798874		STD DEV		TNIT MEAN
CORRECTED TOTAL	121	189.93008934			1.25219357		1.91614754

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
SPECIE	2	0.39799561	0.13	0.8809	2	0.75790856	0.24	0.7857
FERT	4	6.32623216	1.01	0.4064	4	8.67938030	1.38	0.2444
SPECIE*FERT	8	15.43106634	1.23	0.2886	8	15.43106634	1.23	0.2886

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE TNIT

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=107   MS=1.56799

GROUPING	MEAN	N	SPECIE
A	1.990000	40	5
A			
A	1.911538	39	7
A			
A	1.851628	43	2

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE UNIT

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=107 MS=1.56799

GROUPING	MEAN	N	FERT
A	2.187500	24	1
A	2.074800	25	2
A	2.010870	23	5
A	1.751923	26	3
A	1.566667	24	4

YR=76

GENERAL LINEAR MODELS PROCEDURE

MEANS

SPECIE	FERT	N	TNIT
2	1	10	1.86000000
2	2	7	2.28142857
2	3	10	2.14500000
2	4	8	1.41250000
2	5	8	1.53750000
5	1	6	3.15000000
5	2	9	1.75555556
5	3	7	1.38571429
5	4	9	1.82222222
5	5	9	2.08888889
7	1	8	1.87500000
7	2	9	2.23333333
7	3	9	1.60000000
7	4	7	1.41428571
7	5	6	2.52500000

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YR=76

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: DNIT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	14	3.56614473	0.25472462	0.78	0.6934	0.090566	48.9795
ERROR	109	35.81014802	0.32853347		STD DEV		DNIT MEAN
CORRECTED TOTAL	123	39.37629274			0.57317839		1.17024194

SOURCE	DF	TYPE I SS	F VALUE	PR > F
SPECIE	2	0.06364524	0.10	0.9078
FERT	4	1.70050666	1.29	0.2769
SPECIE*FERT	8	1.80199282	0.69	0.7034

SOURCE	DF	TYPE IV SS	F VALUE	PR > F
SPECIE	2	0.04382879	0.07	0.9355
FERT	4	1.71226100	1.30	0.2735
SPECIE*FERT	8	1.80199282	0.69	0.7034

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YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE UNIT

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=109 MS=0.328533

GROUPING	MEAN	N	SPECIE
A	1.202500	40	5
A			
A	1.160250	40	7
A			
A	1.150000	44	2

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE DNIT

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=109   MS=0.326533

GROUPING	MEAN	N	FERT
A	1.376087	23	5
A	1.208750	24	1
A	1.184000	25	2
A	1.075000	26	4
A	1.034615	26	3

YR=76

GENERAL LINEAR MODELS PROCEDURE

MEANS

SPECIE	FERT	N	DNIT
2	1	10	1.03000000
2	2	7	1.04285714
2	3	10	1.16000000
2	4	9	1.18888889
2	5	8	1.33750000
5	1	6	1.33333333
5	2	9	1.16666667
5	3	7	0.87142857
5	4	9	1.08888889
5	5	9	1.52222222
7	1	8	1.33875000
7	2	9	1.31111111
7	3	9	1.02222222
7	4	8	0.93125000
7	5	6	1.20833333

YR=76

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: PNIT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	14	15.75213632	1.12515259	0.86	0.6036	0.106499	141.0858
ERROR	101	132.15689385	1.30848410		STD DEV		PNIT MEAN
CORRECTED TOTAL	115	147.90903017			1.14388990		0.81077586

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
SPECIE	2	0.59558970	0.23	0.7969	2	0.85274447	0.33	0.7227
FERT	4	2.73377441	0.52	0.7195	4	3.43642294	0.66	0.6236
SPECIE*FERT	8	12.42277222	1.19	0.3145	8	12.42277222	1.19	0.3145

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YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE PNIT

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=101 MS=1.30848

GROUPING	MEAN	N	SPECIE
A	0.865000	40	5
A			
A	0.848810	42	2
A			
A	0.700000	34	7

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YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE PNIT

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=101 MS=1.30848

GROUPING	MEAN	N	FERT
A	0.995652	23	1
A	0.981250	24	2
A	0.714583	24	3
A	0.710870	23	4
A	0.640909	22	5

YR=76

GENERAL LINEAR MODELS PROCEDURE

MEANS

SPECIE	FERT	N	PNIT
2	1	10	0.83000000
2	2	7	1.58571429
2	3	9	0.95000000
2	4	8	0.36250000
2	5	8	0.60000000
5	1	6	1.81666667
5	2	9	0.58888889
5	3	7	0.51428571
5	4	9	1.07777778
5	5	9	0.56666667
7	1	7	0.52857143
7	2	8	0.89375000
7	3	8	0.62500000
7	4	6	0.62500000
7	5	5	0.84000000

YR=77

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
SPECIE	3	2 5 7
FERT	5	1 2 3 4 5

NUMBER OF OBSERVATIONS IN BY GROUP = 38

GROUP	OBS	DEPENDENT VARIABLES
1	38	NITA
2	19	TNIT
3	18	DNIT PNIT

NOTE: VARIABLES IN EACH GROUP ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES.

YR=77

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: NITA

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	10	0.05963075	0.00596307	0.17	0.9971	0.059282	123.0770
ERROR	27	0.94625083	0.03504633		STD DEV		NITA MEAN
CORRECTED TOTAL	37	1.00588158			0.18720664		0.15210526

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
SPECIE	2	0.00733616	0.10	0.9010	2*	0.02382574	0.34	0.7148
FERT	4	0.04088259	0.29	0.8808	4*	0.04234641	0.30	0.8740
SPECIE*FERT	4	0.01141201	0.08	0.9874	4	0.01141201	0.08	0.9874

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

B74

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE NITA

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=27   MS=.0350463

GROUPING	MEAN	N	SPECIE
A	0.170833	12	5
A			
A	0.152000	10	2
A			
A	0.138125	16	7

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE NITA

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=27   MS=.0350463

GROUPING	MEAN	N	FERT
A	0.185000	4	1
A	0.183000	5	4
A	0.162143	7	3
A	0.148889	9	5
A	0.126923	13	2

YR=77

GENERAL LINEAR MODELS PROCEDURE

MEANS

SPECIE	FERT	N	NITA
2	1	4	0.18500000
2	2	2	0.07500000
2	3	1	0.14000000
2	4	2	0.22000000
2	5	1	0.05000000
5	2	6	0.15666667
5	5	6	0.18500000
7	2	5	0.11200000
7	3	6	0.16583333
7	4	3	0.15833333
7	5	2	0.09000000

YR=77

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: THIT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	8	1.31867259	0.16483407	0.83	0.5940	0.400020	55.0839
ERROR	10	1.97784583	0.19778458		STD DEV		THIT MEAN
CORRECTED TOTAL	18	3.29651842			0.44472979		0.80736842

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
SPECIE	2	0.48587953	1.23	0.3334	2*	0.37055000	0.94	0.4237
FERT	4	0.54664306	0.69	0.6148	4*	0.81023146	1.02	0.4407
SPECIE*FERT	2	0.28615000	0.72	0.5088	2	0.28615000	0.72	0.5088

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE TNIT

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=10   MS=0.197785

GROUPING	MEAN	N	SPECIE
A	0.966000	5	5
A	0.952000	5	2
A	0.638889	9	7

VR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE TNIT

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=10 MS=0.197785

GROUPING	MEAN	N	FERT
A	1.190000	3	1
A	0.831667	6	2
A	0.768333	3	3
A	0.698000	5	5
A	0.492500	2	4

YR=77

GENERAL LINEAR MODELS PROCEDURE

MEANS

SPECIE	FERT	N	TNIT
2	1	3	1.19000000
2	2	1	0.97000000
2	5	1	0.22000000
5	2	3	0.90666667
5	5	2	1.05500000
7	2	2	0.65000000
7	3	3	0.76833333
7	4	2	0.49250000
7	5	2	0.58000000

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YR=77

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: UNIT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	7	0.12731667	0.01818810	0.24	0.9642	0.144317	47.3709
ERROR	10	0.75488333	0.07548833		STD DEV		UNIT MEAN
CORRECTED TOTAL	17	0.88220000			0.27475140		0.58000000

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
SPECIE	2	0.03619778	0.24	0.7912	2*	0.05899333	0.39	0.6864
FERT	4	0.08602192	0.28	0.8812	4*	0.09109099	0.30	0.8703
SPECIE*FERT	1	0.00509697	0.07	0.8003	1	0.00509697	0.07	0.8003

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

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VR=77

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: PNIT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	7	0.48092361	0.06870337	0.99	0.4883	0.409625	106.1352
ERROR	10	0.69313333	0.06931333		STD DEV		PNIT MEAN
CORRECTED TOTAL	17	1.17405694			0.26327425		0.24805556

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
SPECIE	2	0.42683694	3.08	0.0908	2*	0.09440167	0.68	0.5281
FERT	4	0.04601242	0.17	0.9509	4*	0.05232134	0.19	0.9389
SPECIE*FERT	1	0.00807424	0.12	0.7399	1	0.00807424	0.12	0.7399

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

VR=77

GENFRAL LINEAR MODELS PROCEDURE

DJNCAN'S MLLTIPLE RANGE TEST FOR VAPIABLE DNIT

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=10   MS=.0754883

GROUPING	MEAN	N	SPECIE
A	0.632000	5	5
A			
A	0.615000	4	2
A			
A	0.535556	9	7

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE PNIT

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=10 MS=.0693133

GROUPING		MEAN	N	SPECIE
	A	0.470000	4	2
	A			
B	A	0.334000	5	5
B				
B		0.101667	9	7

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE DNIT

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=10   MS=.0754883

GROUPING	MEAN	N	FERT
A	0.640000	3	3
A	0.630000	4	5
A	0.623333	3	1
A	0.530000	6	2
A	0.475000	2	4

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE PNIT

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=10   MS=.0693133

GROUPING	MEAN	N	FERT
A	0.500000	3	1
A	0.301667	6	2
A	0.187500	4	5
A	0.128333	3	3
A	0.010000	2	4

YR=77

GENERAL LINEAR MODELS PROCEDURE

MEANS

SPECIE	FERT	N	DNIT	PNIT
2	1	3	0.62333333	0.50000000
2	2	1	0.59000000	0.38000000
5	2	3	0.56333333	0.34333333
5	5	2	0.73500000	0.32000000
7	2	2	0.45000000	0.20000000
7	3	3	0.64000000	0.12833333
7	4	2	0.47500000	0.01000000
7	5	2	0.52500000	0.05500000

PART 2

YR=76

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
ZONE	3	1 2 3
FERT	5	1 2 3 4 5

NUMBER OF OBSERVATIONS IN BY GROUP = 135

GROUP	OBS	DEPENDENT VARIABLES
1	134	AMMO OPHOS
2	111	OPHOS PPHOS TPHOS
3	133	EH
4	134	PH

NOTE: VARIABLES IN EACH GROUP ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES.

YR=76

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: AMMO

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	13	2.18376939	0.16798226	1.12	0.3522	0.107858	233.3940
ERROR	120	18.06285244	0.15052377		STD DEV		AMMO MEAN
CORRECTED TOTAL	133	20.24662183			0.38797393		0.16623134

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
ZONE	2	0.44808651	1.49	0.2299	2*	0.45331996	1.51	0.2260
FERT	4	0.81027501	1.35	0.2570	4*	0.67215879	1.12	0.3521
ZONE*FERT	7	0.92540787	0.88	0.5270	7	0.92540787	0.88	0.5270

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

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GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: OPHOS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	13	1.06257242	0.08173634	1.26	0.2472	0.119998	152.7128
ERROR	120	7.79231116	0.06493593		STD DEV		OPHOS MEAN
CORRECTED TOTAL	133	8.85488358			0.25482529		0.16686567

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
ZONE	2	0.12705814	0.98	0.3789	2*	0.09978004	0.77	0.4661
FERT	4	0.54539021	2.10	0.0850	4*	0.36826844	1.42	0.2322
ZONE*FERT	7	0.39012408	0.86	0.5429	7	0.39012408	0.86	0.5429

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE AMMO

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=120   MS=0.150524

GROUPING	MEAN	N	ZONE
A	0.218824	34	1
A	0.201792	53	2
A	0.088085	47	3

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GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE OPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=120 MS=.0649359

GROUPING	MEAN	N	ZONE
A	0.200566	53	2
A	0.166471	34	1
A	0.129149	47	3

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE AMMC

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=120   MS=0.150524

GROUPING	MEAN	N	FERT
A	0.277619	21	4
A	0.237037	27	3
A	0.140179	28	2
A	0.121111	27	1
A	0.091935	31	5

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S T A T I S T I C A L   A N A L Y S I S   S Y S T E M        0:44 SUNDAY, MARCH 5, 1978    7
                                YR=76
                   GENERAL LINEAR MODELS PROCEDURE
            DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE OPHOS

      MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.
            ALPHA LEVEL=.05        DF=120       MS=.0649359

              GROUPING                     MEAN       N     FERT

                        A               0.289630     27     3
                        A
              B         A               0.162581     31     5
              B         A
              B         A               0.147778     27     1
              B
              B                         0.126190     21     4
              B
              B                         0.102143     28     2
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YR=76

GENERAL LINEAR MODELS PROCEDURE

MEANS

ZONE	FERT	N	AMMO	OPHOS
1	1	9	0.15222222	0.17222222
1	2	10	0.22900000	0.08200000
1	3	6	0.50333333	0.20833333
1	5	9	0.08444444	0.22666667
2	1	11	0.08909091	0.15181818
2	2	8	0.13312500	0.11750000
2	3	12	0.20583333	0.42750000
2	4	11	0.46000000	0.12545455
2	5	11	0.10181818	0.13727273
3	1	7	0.13142857	0.11000000
3	2	10	0.05700000	0.11000000
3	3	9	0.10111111	0.16000000
3	4	10	0.07700000	0.12700000
3	5	11	0.08818182	0.13545455

YR=76

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: DPHOS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	13	1.46499442	0.11269188	1.40	0.1737	0.157821	140.5839
ERROR	97	7.81761414	0.08059396		STD DEV		DPHOS MEAN
CORRECTED TOTAL	110	9.28260856			0.28389075		0.20193694

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
ZONE	2	0.10178394	0.63	0.5340	2*	0.08803062	0.55	0.5810
FERT	4	0.68688943	2.13	0.0828	4*	0.58737804	1.82	0.1308
ZONE*FERT	7	0.67631505	1.20	0.3105	7	0.67631505	1.20	0.3105

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

YR=76

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: PPHOS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	13	17.27440410	1.32880032	2.27	0.0119	0.233024	177.1572
ERROR	97	56.85687698	0.58615337		STD DEV		PPHOS MEAN
CORRECTED TOTAL	110	74.13128108			0.76560654		0.43216216

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
ZONE	2	1.61484406	1.38	0.2571	2*	1.53900592	1.31	0.2739
FERT	4	5.04060316	2.15	0.0804	4*	5.85625220	2.50	0.0476
ZONE*FERT	7	10.61895688	2.59	0.0172	7	10.61895688	2.59	0.0172

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

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GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: TPHOS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	13	22.07609680	1.69831514	2.52	0.0051	0.252729	129.8175
ERROR	97	65.28081176	0.67299806		STD DEV		TPHOS MEAN
CORRECTED TOTAL	110	87.35890856			0.82036459		0.63193694

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
ZONE	2	1.79007169	1.33	0.2693	2*	1.71518508	1.27	0.2843
FERT	4	9.50922689	3.53	0.0098	4*	10.06257951	3.74	0.0071
ZONE*FERT	7	10.77879822	2.29	0.0334	7	10.77879822	2.29	0.0334

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE DPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=97 MS=0.080594

GROUPING	MEAN	N	ZONE
A	0.238977	44	2
A	0.183333	30	1
A	0.172973	37	3

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE PPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=97   MS=0.586153

GROUPING	MEAN	N	ZONE
A	0.608667	30	1
A	0.425682	44	2
A	0.296757	37	3

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE TPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=97 MS=0.672998

GROUPING	MEAN	N	ZONE
A	0.792000	30	1
A			
A	0.660114	44	2
A			
A	0.468649	37	3

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE DPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=97   MS=0.080594

GROUPING		MEAN	N	FERT
	A	0.349565	23	3
B	A	0.212500	16	4
B	A	0.175217	23	1
B		0.143958	24	2
B		0.139600	25	5

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE PPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=97   MS=0.586153

GROUPING	MEAN	N	FERT
A	0.820000	23	3
B A	0.431250	16	4
B	0.342174	23	1
B	0.293600	25	5
B	0.291667	24	2

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE TPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=97 MS=0.672998

GROUPING		MEAN	N	FERT
	A	1.169565	23	3
B	A	0.643750	16	4
B		0.513043	23	1
B		0.433600	25	5
B		0.429375	24	2

B106

YR=76

GENERAL LINEAR MODELS PROCEDURE

MEANS

ZONE	FERT	N	DPHOS	PPHOS	TPHOS
1	1	8	0.19375000	0.20000000	0.39375000
1	2	8	0.10625000	0.50875000	0.61500000
1	3	6	0.24000000	1.74333333	1.98333333
1	5	8	0.20750000	0.26625000	0.47375000
2	1	9	0.17888889	0.08777778	0.25555556
2	2	8	0.12312500	0.19000000	0.31187500
2	3	9	0.55777778	0.76444444	1.32222222
2	4	9	0.23333333	0.62222222	0.85555556
2	5	9	0.08888889	0.43777778	0.51666667
3	1	6	0.14500000	0.91333333	1.05833333
3	2	8	0.20250000	0.17625000	0.36125000
3	3	8	0.19750000	0.19000000	0.38750000
3	4	7	0.18571429	0.18571429	0.37142857
3	5	8	0.12875000	0.15875000	0.30000000

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YR=76

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: EH

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	13	79279.96739956	6098.45903074	0.89	0.5668	0.088541	18.8514
ERROR	119	816124.00252526	6858.18489517		STD DEV		EH MEAN
CORRECTED TOTAL	132	895403.96992482			82.81415878		439.30075188

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
ZONE	2	22566.44857405	1.65	0.1973	2*	17034.33781370	1.24	0.2926
FERT	4	13354.51931200	0.49	0.7454	4*	22596.06159823	0.82	0.5126
ZONE*FERT	7	43358.99951351	0.90	0.5075	7	43358.99951351	0.90	0.5075

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

B108

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE EH

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=119 MS=6858.18

GROUPING	MEAN	N	ZONE
A	451.866667	45	3
A	442.074074	54	2
A	418.264706	34	1

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE EH

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=119   MS=6858.18

GROUPING	MEAN	N	FERT
A	460.190476	21	4
A	444.551724	29	2
A	441.200000	25	1
A	428.870968	31	5
A	427.629630	27	3

B110

YR=76

GENERAL LINEAR MODELS PROCEDURE

MEANS

ZONE	FERT	N	EH
1	1	9	425.111111
1	2	10	436.500000
1	3	6	354.833333
1	5	9	433.444444
2	1	11	464.909091
2	2	9	435.777778
2	3	12	438.583333
2	4	11	452.181818
2	5	11	418.090909
3	1	5	418.000000
3	2	10	460.500000
3	3	9	461.555556
3	4	10	469.000000
3	5	11	435.909091

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YR=76

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: PH

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	13	1.14670142	0.08820780	0.41	0.9634	0.042557	6.5402
ERROR	120	25.79867172	0.21498893		STD DEV		PH MEAN
CORRECTED TOTAL	133	26.94537313			0.46366899		7.08955224

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
ZONE	2	0.29936926	0.70	0.5008	2*	0.13981181	0.33	0.7230
FERT	4	0.46111498	0.54	0.7094	4*	0.40840583	0.47	0.7541
ZONE*FERT	7	0.38651717	0.26	0.9680	7	0.38651717	0.26	0.9680

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE PH

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=120   MS=0.214989

GROUPING	MEAN	N	ZONE
A	7.141304	46	3
A	7.090741	54	2
A	7.017647	34	1

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YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE PH

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=120 MS=0.214989

GROUPING	MEAN	N	FERT
A	7.180952	21	4
A	7.140741	27	3
A	7.111538	26	1
A	7.051613	31	5
A	6.996552	29	2

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YR=76

GENERAL LINEAR MODELS PROCEDURE

MEANS

ZONE	FERT	N	PH
1	1	9	7.13333333
1	2	10	6.93000000
1	3	6	7.10000000
1	5	9	6.94444444
2	1	11	7.04545455
2	2	9	7.07777778
2	3	12	7.14166667
2	4	11	7.08181818
2	5	11	7.10000000
3	1	6	7.20000000
3	2	10	6.99000000
3	3	9	7.16666667
3	4	10	7.29000000
3	5	11	7.09090909

YR=77

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
ZONE	3	1 2 3
FERT	5	1 2 3 4 5

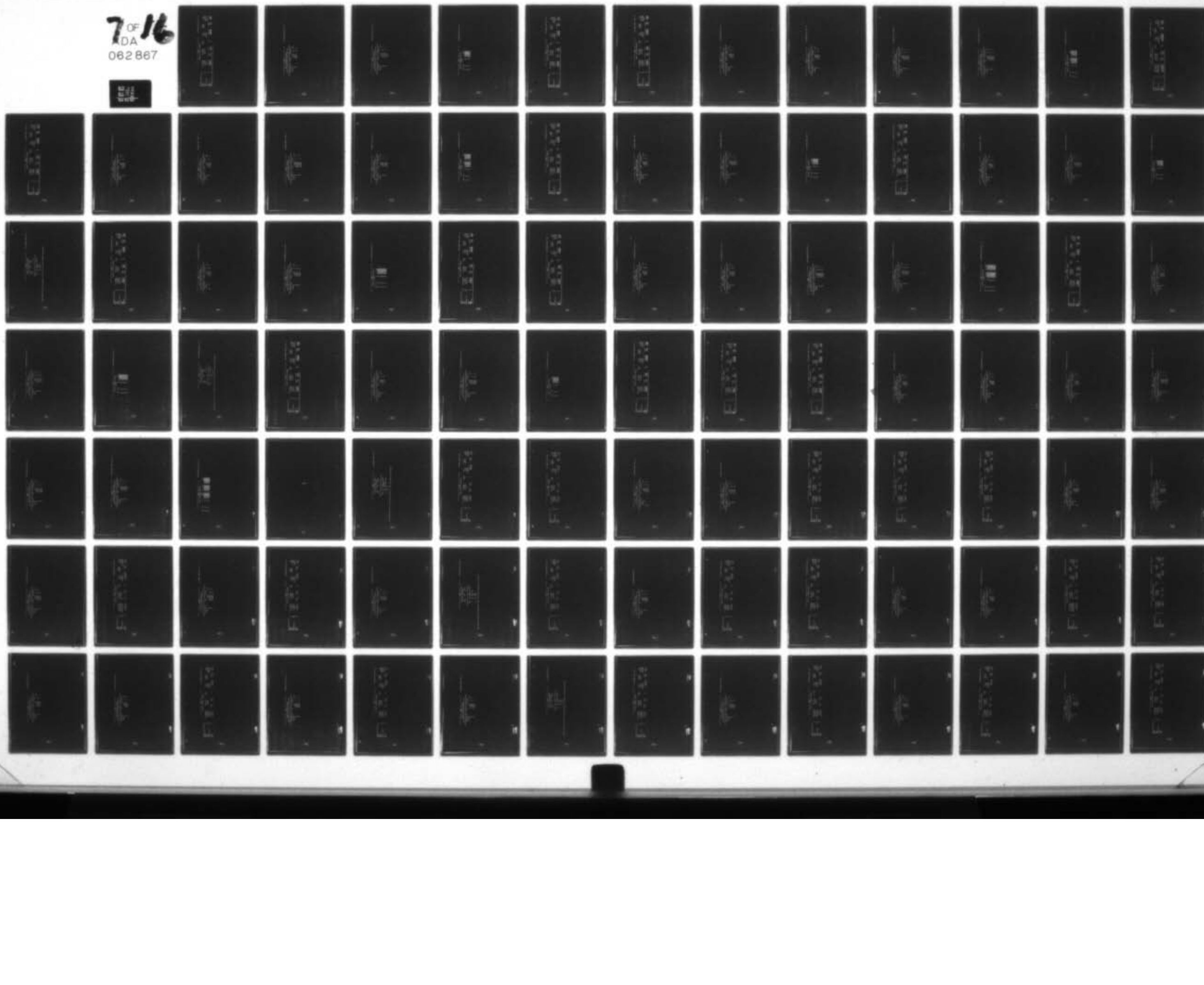
NUMBER OF OBSERVATIONS IN BY GROUP = 49

GROUP	OBS	DEPENDENT VARIABLES
1	47	AMMO
2	23	OPHOS PPHOS
3	29	EH PH
4	49	OPHOS
5	24	TPHOS

NOTE: VARIABLES IN EACH GROUP ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES.

AD-A062 867 GEORGIA UNIV BRUNSWICK MARINE EXTENSION SERVICE F/G 13/2
HABITAT DEVELOPMENT FIELD INVESTIGATIONS BUTTERMILK SOUND MARSH--ETC(U)
JUL 78 R J REIMOLD, M A HARDISKY, P C ADAMS DACW21-75-C-0074
UNCLASSIFIED WES-TR-D-78-26-APP-A NL

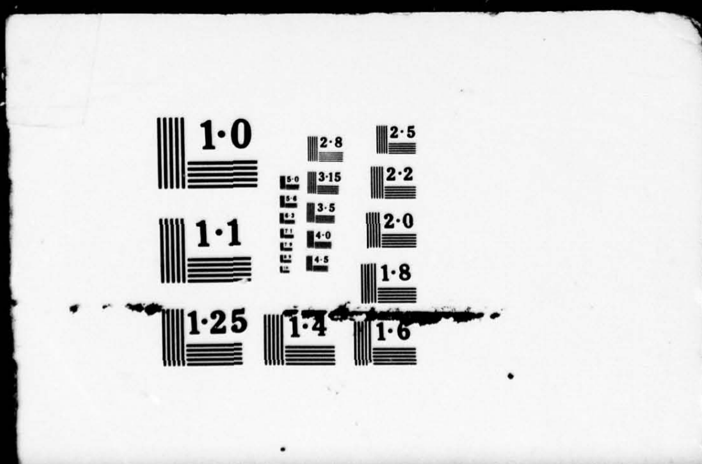
7 OF 16
ADA
062867



7 OF 16

ADA

062867



YR=77

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: AMMO

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	8	0.15014121	0.01876765	0.21	0.9863	0.043220	82.1039
ERROR	38	3.32375667	0.08746728		STD DEV		AMMO MEAN
CORRECTED TOTAL	46	3.47389787			0.29574868		0.36021277

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
ZONE	2	0.06519602	0.37	0.6914	2*	0.00681158	0.04	0.9618
FERT	4	0.04665519	0.13	0.9691	4*	0.08027387	0.23	0.9202
ZONE*FERT	2	0.03829000	0.22	0.8044	2	0.03829000	0.22	0.8044

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

3117

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE AMMO

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=38   MS=.0874673

GROUPING	MEAN	N	ZONE
A	0.427500	8	1
A	0.381667	12	3
A	0.330741	27	2

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE AMMO

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=38 MS=.0874673

GROUPING	MEAN	N	FERT
A	0.378333	12	5
A	0.374000	15	2
A	0.355000	6	4
A	0.352000	5	3
A	0.321111	9	1

B119

YR=77

GENERAL LINEAR MODELS PROCEDURE

MEANS

ZONE	FERT	N	AMMO
1	1	4	0.45000000
1	2	4	0.40500000
2	1	5	0.21800000
2	2	5	0.34200000
2	3	5	0.35200000
2	4	6	0.35500000
2	5	6	0.37333333
3	2	6	0.39000000
3	5	6	0.38333333

B120

YR=77

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: DPHOS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	8	1.68269783	0.21033723	0.50	0.8382	0.221532	79.6352
ERROR	14	5.91305000	0.42236071		STD DEV		DPHOS MEAN
CORRECTED TOTAL	22	7.59574783			0.64989285		0.81608696

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
ZONE	2	0.32980997	0.39	0.6839	2*	0.31944902	0.38	0.6919
FERT	4	1.32465914	0.73	0.5542	4*	1.08267451	0.64	0.6421
ZONE*FERT	2	0.02822871	0.03	0.9672	2	0.02822871	0.03	0.9672

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

B121

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   0:44 SUNDAY, MARCH 5, 1978   33

VR=77

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: PPHOS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	8	19.86412754	2.48301594	0.62	0.7498	0.260928	241.1533
ERROR	14	56.26453333	4.01889524		STD DEV		PPHOS MEAN
CORRECTED TOTAL	22	76.12866087			2.00471824		0.83130435

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
ZONE	2	5.41198944	0.67	0.5258	2*	1.59216471	0.20	0.8226
FERT	4	14.09907011	0.88	0.5022	4*	13.58492941	0.85	0.5196
ZONE*FERT	2	0.35306799	0.04	0.9572	2	0.35306799	0.04	0.9572

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

B122

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE DPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=14   MS=0.422361

GROUPING	MEAN	N	ZONE
A	1.067500	4	1
A	0.784286	14	2
A	0.704000	5	3

B123

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE PPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=14 MS=4.0189

GROUPING	MEAN	N	ZONE
A	1.575000	4	1
A	0.901429	14	2
A	0.040000	5	3

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE DPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=14 MS=0.422361

GROUPING	MEAN	N	FERT
A	1.280000	3	4
A	0.981667	6	2
A	0.686667	3	3
A	0.636667	6	5
A	0.632000	5	1

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE PPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=14   MS=4.0189

GROUPING	MEAN	N	FERT
A	2.703333	3	4
A	1.046667	3	3
A	0.766000	5	1
A	0.540000	6	2
A	0.133333	6	5

YR=77

GENERAL LINEAR MODELS PROCEDURE

MEANS

ZONE	FERT	N	DPHOS	PPHOS
1	1	2	0.81000000	1.85000000
1	2	2	1.32500000	1.30000000
2	1	3	0.51333333	0.04333333
2	2	2	0.82000000	0.27000000
2	3	3	0.68666667	1.04666667
2	4	3	1.28000000	2.70333333
2	5	3	0.63333333	0.23333333
3	2	2	0.80000000	0.05000000
3	5	3	0.64000000	0.03333333

YR=77

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: EH

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	8	69120.95114943	8640.11889368	0.31	0.9521	0.111127	38.3464
ERROR	20	552880.08333333	27644.00416667		STD DEV		EH MEAN
CORRECTED TOTAL	28	622001.03448276			166.26486149		433.58620690

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
ZONE	2	22543.49498696	0.41	0.6706	2*	30199.75000000	0.55	0.5875
FERT	4	31864.46181218	0.29	0.8822	4*	12188.87449799	0.11	0.9775
ZONE*FERT	2	14712.99435026	0.27	0.7690	2	14712.99435028	0.27	0.7690

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

YR=77

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: PH

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	8	0.98867816	0.12358477	0.50	0.8436	0.166015	7.5034
ERROR	20	4.96666667	0.24833333		STD DEV		PH MEAN
CORRECTED TOTAL	28	5.95534483			0.49833055		6.64137931

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
ZONE	2	0.06742046	0.14	0.8739	2*	0.01111111	0.02	0.9779
FERT	4	0.67439330	0.68	0.6146	4*	0.79861446	0.80	0.5370
ZONE*FERT	2	0.24686441	0.50	0.6156	2	0.24686441	0.50	0.6156

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

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YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE EH

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=20 MS=27644

GROUPING	MEAN	N	ZONE
A	457.142857	7	3
A	441.352941	17	2
A	374.200000	5	1

B130

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE PH

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=20 MS=0.248333

GROUPING	MEAN	N	ZONE
A	6.685714	7	3
A	6.652941	17	2
A	6.540000	5	1

B131

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE EH

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=20   MS=27644

GROUPING	MEAN	N	FERT
A	486.250000	4	4
A	453.200000	5	1
A	445.500000	8	5
A	432.666667	3	3
A	389.000000	9	2

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE PH

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=20 MS=0.248393

GROUPING	MEAN	N	FERT
A	6.800000	3	3
A	6.720000	5	1
A	6.711111	9	2
A	6.600000	8	5
A	6.350000	4	4

YR=77

GENERAL LINEAR MODELS PROCEDURE

MEANS

ZONE	FERT	N	EH	PH
1	1	2	424.000000	6.35000000
1	2	3	341.000000	6.46666667
2	1	3	472.666667	6.96666667
2	2	3	350.000000	6.73333333
2	3	3	432.666667	6.80000000
2	4	4	486.250000	6.35000000
2	5	4	448.000000	6.55000000
3	2	3	476.000000	6.73333333
3	5	4	443.000000	6.65000000

B134

YR=77

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: OPHOS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	8	1.81569112	0.22696139	0.63	0.7437	0.112654	100.0666
ERROR	40	14.30171500	0.35754287		STD DEV		OPHOS MEAN
CORRECTED TOTAL	48	16.11740612			0.59794889		0.59755102

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
ZONE	2	0.58160374	0.81	0.4506	2*	0.25023032	0.35	0.7069
FERT	4	0.68228846	0.43	0.7523	4*	0.71714654	0.50	0.7348
ZONE*FERT	2	0.55179892	0.77	0.4690	2	0.55179892	0.77	0.4690

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

VR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE OPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=40 MS=0.357543

GROUPING	MEAN	N	ZONE
A	0.720000	9	1
A	0.636786	28	2
A	0.414167	12	3

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE OPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=40   MS=0.357543

GROUPING	MEAN	N	FERT
A	0.920000	6	4
A	0.696667	9	1
A	0.528333	6	3
A	0.520000	16	2
A	0.500000	12	5

YR=77

GENERAL LINEAR MODELS PROCEDURE

MEANS

ZONE	FERT	N	OPHOS
1	1	4	0.98750000
1	2	5	0.50600000
2	1	5	0.46400000
2	2	5	0.66000000
2	3	6	0.52833333
2	4	6	0.92000000
2	5	6	0.58666667
3	2	6	0.41500000
3	5	6	0.41333333

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YR=77

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: TPHOS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	8	12.81061250	1.60132656	1.48	0.2442	0.441084	85.2984
ERROR	15	16.23288333	1.08219222		STD DEV		TPHOS MEAN
CORRECTED TOTAL	23	29.04349583			1.04028468		1.21958333

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
ZONE	2	9.50452679	4.39	0.0315	2*	4.23413415	1.96	0.1758
FERT	4	3.19542905	0.74	0.5804	4*	3.29091889	0.76	0.5671
ZONE*FERT	2	0.11065667	0.05	0.9503	2	0.11065667	0.05	0.9503

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE TPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=15   MS=1.08219

GROUPING	MEAN	N	ZONE
A	2.580000	4	1
B	1.062857	14	2
B	0.678333	6	3

B140

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE TPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=15   MS=1.08219

GROUPING	MEAN	N	FERT
A	1.933333	3	3
A	1.384286	7	2
A	1.348000	5	1
A	0.873333	3	4
A	0.736667	6	5

B141

YR=77

GENERAL LINEAR MODELS PROCEDURE

MEANS

ZONE	FERT	N	TPHOS
1	1	2	2.53500000
1	2	2	2.62500000
2	1	3	0.55666667
2	2	2	1.09500000
2	3	3	1.93333333
2	4	3	0.87333333
2	5	3	0.86666667
3	2	3	0.75000000
3	5	3	0.60666667

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YR=76

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
ZONE	3	1 2 3
FERT	5	1 2 3 4 5

NUMBER OF OBSERVATIONS IN BY GROUP = 140

GROUP	OBS	DEPENDENT VARIABLES
1	132	NITA
2	120	TNIT DNIT
3	116	PNIT

NOTE: VARIABLES IN EACH GROUP ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES.

B143

YR=76

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: NITA

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	13	3.45399826	0.26569217	1.14	0.3307	0.111819	113.8709
ERROR	118	27.43505837	0.23250049		STD DEV		NITA MEAN
CORRECTED TOTAL	131	30.88905663			0.48218305		0.42344697

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
ZONE	2	1.14594254	2.46	0.0894	2*	1.25100418	2.69	0.0720
FERT	4	1.32587119	1.43	0.2297	4*	1.10795958	1.19	0.3183
ZONE*FERT	7	0.98218453	0.60	0.7536	7	0.98218453	0.60	0.7536

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

B144

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YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE NITA

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=118 MS=0.2325

GROUPING		MEAN	N	ZONE
	A	0.538511	47	3
	A			
B	A	0.396442	52	2
B				
B		0.302121	33	1

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE NITA

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=118 MS=0.2325

GROUPING	MEAN	N	FERT
A	0.577097	31	5
A	0.418148	27	1
A	0.385179	28	2
A	0.355385	26	3
A	0.334500	20	4

YR=76

GENERAL LINEAR MODELS PROCEDURE

MEANS

ZONE	FERT	N	NITA
1	1	9	0.19777778
1	2	10	0.26100000
1	3	5	0.16000000
1	5	9	0.53111111
2	1	11	0.56363636
2	2	8	0.47062500
2	3	12	0.23166667
2	4	10	0.23800000
2	5	11	0.49909091
3	1	7	0.47285714
3	2	10	0.44100000
3	3	9	0.62888889
3	4	10	0.43100000
3	5	11	0.69272727

B147

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   22:45 SATURDAY, MARCH 4, 1978   6

YR=76

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: TNIT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	13	44.96099336	3.45853795	0.85	0.6064	0.094522	91.6129
ERROR	106	430.70492143	4.06325398		STD DEV		TNIT MEAN
CORRECTED TOTAL	119	475.66591479			2.01575147		2.20023167

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
ZONE	2	3.11092260	0.38	0.6829	2*	2.23433470	0.27	0.7602
FERT	4	9.97522185	0.61	0.6537	4*	6.90458232	0.42	0.7904
ZONE*FERT	7	31.87484891	1.12	0.3556	7	31.87484891	1.12	0.3556

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

B148

YR=76

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: DNIT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	13	8.46067901	0.65082146	0.84	0.6151	0.093675	65.9867
ERROR	106	81.85845349	0.77224956		STD DEV		DNIT MEAN
CORRECTED TOTAL	119	90.31913250			0.87877731		1.33175000

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
ZONE	2	1.05276375	0.68	0.5080	2*	1.02484858	0.66	0.5171
FERT	4	1.43857534	0.47	0.7608	4*	1.16576221	0.38	0.8243
ZONE*FERT	7	5.96933992	1.10	0.3659	7	5.96933992	1.10	0.3659

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE TNIT

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=106 MS=4.06325

GROUPING	MEAN	N	ZONE
A	2.367187	48	2
A	2.212812	32	1
A	1.990000	40	3

B150

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE UNIT

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=106   MS=0.77225

GROUPING	MEAN	N	ZONE
A	1.416875	48	2
A	1.365625	32	1
A	1.202500	40	3

B151

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE TNIT

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=106   MS=4.06325

GROUPING	MEAN	N	FERT
A	2.800000	19	4
A	2.233333	27	5
A	2.060000	25	1
A	2.039091	22	3
A	2.006481	27	2

B152

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   22:45 SATURDAY, MARCH 4, 1978   11

VR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE DNIT

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=106   MS=0.77225

GROUPING	MEAN	N	FERT
A	1.485185	27	5
A	1.354545	22	3
A	1.350526	19	4
A	1.287037	27	2
A	1.180000	25	1

YR=76

GENERAL LINEAR MODELS PROCEDURE

MEANS

ZONE	FERT	N	TNIT	DNIT
1	1	9	1.80000000	1.17777778
1	2	9	2.60111111	1.66666667
1	3	6	2.08333333	1.43333333
1	5	8	2.33750000	1.18750000
2	1	10	1.64000000	1.09000000
2	2	9	1.66277778	1.02777778
2	3	9	2.51777778	1.67777778
2	4	10	3.68000000	1.58600000
2	5	10	2.28000000	1.69000000
3	1	6	3.15000000	1.33333333
3	2	9	1.75555556	1.16666667
3	3	7	1.38571429	0.87142857
3	4	9	1.82222222	1.08888889
3	5	9	2.08888889	1.52222222

YR=76

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: PNIT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	13	23.77731938	1.82902457	0.60	0.8482	0.071229	193.1603
ERROR	102	310.03690476	3.03957750		STD DEV		PNIT MEAN
CORRECTED TOTAL	115	333.81422414			1.74343841		0.90258621

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
ZONE	2	0.15798604	0.03	0.9744	2*	0.01888602	0.00	0.9969
FERT	4	10.85203421	0.89	0.4713	4*	11.32923510	0.93	0.4487
ZONE*FERT	7	12.76729912	0.60	0.7562	7	12.76729912	0.60	0.7562

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE PNIT

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=102   MS=3.03958

GROUPING	MEAN	N	ZONE
A	0.945833	48	2
A	0.882143	28	1
A	0.865000	40	3

B156

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE PNIT

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=102 MS=3.03958

GROUPING	MEAN	N	FERT
A	1.560526	19	4
A	0.904167	24	1
A	0.771154	26	2
A	0.719231	26	5
A	0.695238	21	3

B157

YR=76

GENERAL LINEAR MODELS PROCEDURE

MEANS

ZONE	FERT	N	PNIT
1	1	8	0.66250000
1	2	8	1.02500000
1	3	5	0.70000000
1	5	7	1.10000000
2	1	10	0.55000000
2	2	9	0.72777778
2	3	9	0.83333333
2	4	10	1.99500000
2	5	10	0.59000000
3	1	6	1.81666667
3	2	9	0.58898889
3	3	7	0.51428571
3	4	9	1.07777778
3	5	9	0.56666667

B158

YR=77

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
ZONE	3	1 2 3
FERT	5	1 2 3 4 5

NUMBER OF OBSERVATIONS IN BY GROUP = 49

GROUP	OBS	DEPENDENT VARIABLES
1	49	VITA
2	22	TNIT ONIT PNIT

NOTE: VARIABLES IN EACH GROUP ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES.

YR=77

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: NITA

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	8	0.30443541	0.03805443	0.89	0.5309	0.151602	142.0302
ERROR	40	1.70368500	0.04259212		STD DEV		NITA MEAN
CORRECTED TOTAL	48	2.00812041			0.20637860		0.14530612

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
ZONE	2	0.04806088	0.56	0.5733	2*	0.03181661	0.37	0.6907
FERT	4	0.14589216	0.85	0.4984	4*	0.04368194	0.26	0.9040
ZONE*FERT	2	0.11048236	1.30	0.2846	2	0.11048236	1.30	0.2846

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

B160

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE NITA

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=40 MS=.0425921

GROUPING	MEAN	N	ZONE
A	0.193333	9	1
A	0.170833	12	3
A	0.118929	28	2

B161

VR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE NITA

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=40   MS=.0425921

GROUPING	MEAN	N	FERT
A	0.231111	9	1
A	0.170833	6	4
A	0.157917	12	5
A	0.111875	16	2
A	0.055000	6	3

B162

YR=77

GENERAL LINEAR MODELS PROCEDURE

MEANS

ZONE	FERT	N	NITA
1	1	4	0.36500000
1	2	5	0.05600000
2	1	5	0.12400000
2	2	5	0.11400000
2	3	6	0.05500000
2	4	6	0.17083333
2	5	6	0.13083333
3	2	6	0.15666667
3	5	5	0.18500000

B163

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YR=77

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: TNIT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	8	0.33566970	0.04195871	0.22	0.9798	0.120971	54.6726
ERROR	13	2.43911667	0.18762436		STD DEV		TNIT MEAN
CORRECTED TOTAL	21	2.77478636			0.43315628		0.79227273

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
ZONE	2	0.21486636	0.57	0.5777	2*	0.04021995	0.11	0.8991
FERT	4	0.03460447	0.05	0.9955	4*	0.01186884	0.02	0.9994
ZONE*FERT	2	0.08619886	0.23	0.7979	2	0.08619886	0.23	0.7979

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

B164

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YR=77

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: UNIT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	8	0.20492727	0.02561591	0.22	0.9812	0.118477	60.4204
ERROR	13	1.52475000	0.11728846		STD DEV		UNIT MEAN
CORRECTED TOTAL	21	1.72967727			0.34247403		0.56681818

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
ZONE	2	0.08810497	0.38	0.6941	2*	0.00507923	0.02	0.9786
FERT	4	0.03134354	0.07	0.9910	4*	0.02634638	0.06	0.9934
ZONE*FERT	2	0.08577377	0.37	0.7006	2	0.08577877	0.37	0.7006

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

B165

STATISTICAL ANALYSIS SYSTEM 22:45 SATURDAY, MARCH 4, 1978 24

YR=77

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: PNIT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	8	0.12051212	0.01506402	0.52	0.8248	0.240762	75.8368
ERROR	13	0.38003333	0.02923333		STD DEV		PNIT MEAN
CORRECTED TOTAL	21	0.50054545			0.17097758		0.22545455

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
ZONE	2	0.08753315	1.50	0.2599	2*	0.02720355	0.47	0.6380
FERT	4	0.02050591	0.13	0.9471	4*	0.03156739	0.27	0.8921
ZONE*FERT	2	0.01247306	0.21	0.8107	2	0.01247306	0.21	0.8107

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

B166

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE TNIT

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=13 MS=0.137624

GROUPING	MEAN	N	ZONE
A	0.966000	5	3
A	0.760000	13	2
A	0.680000	4	1

B167

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE DNIT

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=13 MS=0.117288

GROUPING	MEAN	N	ZONE
A	0.632000	5	3
A	0.580769	13	2
A	0.440000	4	1

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE PNIT

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=13 MS=.0292333

GROUPING	MEAN	N	ZONE
A	0.334000	5	3
A	0.240000	4	1
A	0.179231	13	2

YK=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE TNIT

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=13 MS=0.137624

GROUPING	MEAN	N	FERT
A	0.871667	6	2
A	0.870000	5	5
A	0.746667	3	3
A	0.726667	3	4
A	0.686000	5	1

B170

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   22:45 SATURDAY, MARCH 4, 1978   29

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE UNIT

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=13   MS=0.117288

GROUPING	MEAN	N	FERT
A	0.624000	5	5
A	0.583333	3	3
A	0.578333	6	2
A	0.526000	5	1
A	0.500000	3	4

B171

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE PNIT

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=13   MS=.0292333

GROUPING	MEAN	N	FERT
A	0.293333	6	2
A	0.246000	5	5
A	0.226667	3	4
A	0.163333	3	3
A	0.160000	5	1

B172

YR=77

GENERAL LINEAR MODELS PROCEDURE

MEANS

ZONE	FERT	N	TNIT	DNIT	PNIT
1	1	2	0.62000000	0.37500000	0.24500000
1	2	2	0.74000000	0.50500000	0.23500000
2	1	3	0.73000000	0.62666667	0.10333333
2	2	1	1.03000000	0.77000000	0.26000000
2	3	3	0.74666667	0.58333333	0.16333333
2	4	3	0.72666667	0.50000000	0.22666667
2	5	3	0.74666667	0.55000000	0.19666667
3	2	3	0.90666667	0.56333333	0.34333333
3	5	2	1.05500000	0.73500000	0.32000000

PART 3

YR=76

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
CCAT	4	0 1 2 3

NUMBER OF OBSERVATIONS IN BY GROUP = 361

GROUP	OBS	DEPENDENT VARIABLES
1	354	AMMO OPHOS
2	300	OPHOS PPHOS TPHOS
3	349	EH
4	351	PH

NOTE: VARIABLES IN EACH GROUP ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES.

B175

YR=76

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: AMMO

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	3	2.89600861	0.96533620	3.52	0.0154	0.029267	279.0024
ERROR	350	96.05692839	0.27444837		STD DEV		AMMO MEAN
CORRECTED TOTAL	353	98.95293701			0.52387820		0.18776836

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
CONT	3	2.89600861	3.52	0.0154	3	2.89600861	3.52	0.0154

B176

YR=76

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: OPHOS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	3	0.14193763	0.04731254	0.96	0.4128	0.008159	153.7484
ERROR	350	17.23274966	0.04923643		STD DEV		OPHOS MEAN
CORRECTED TOTAL	353	17.37468729			0.22189283		0.14432203

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
CONT	3	0.14193763	0.96	0.4128	3	0.14193763	0.96	0.4128

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE AMMO

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=350   MS=0.274448

GROUPING	MEAN	N	CONT
A	0.515833	24	2
B A	0.286667	3	3
B	0.165552	317	0
B	0.075000	10	1

B178

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE OPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=350   MS=.0492364

GROUPING	MEAN	N	CONT
A	0.176667	3	3
A	0.150095	317	0
A	0.102917	24	2
A	0.051000	10	1

B179

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YR=76

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: DPHOS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	3	2.23047661	0.74349220	3.57	0.0144	0.034962	222.6869
ERROR	296	61.56631139	0.20799328		STD DEV		DPHOS MEAN
CORRECTED TOTAL	299	63.79648800			0.45606280		0.20480000

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
CONT	3	2.23047661	3.57	0.0144	3	2.23047661	3.57	0.0144

B180

YR=76

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: PPHOS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	3	12.89284961	4.29761654	7.29	0.0001	0.068819	185.3906
ERROR	296	174.45260739	0.58936692		STD DEV		PPHOS MEAN
CORRECTED TOTAL	299	187.34545700			0.76770236		0.41410000

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
CONT	3	12.89284961	7.29	0.0001	3	12.89284961	7.29	0.0001

B181

YR=76

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: TPHOS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	3	23.41220012	7.80406671	9.10	0.0001	0.084412	146.2639
ERROR	296	253.94459855	0.85792094		STD DEV		TPHOS MEAN
CORRECTED TOTAL	299	277.35679867			0.92624022		0.63326667

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
CONT	3	23.41220012	9.10	0.0001	3	23.41220012	9.10	0.0001

B182

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   0:52 SUNDAY, MARCH 5, 1978   9

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE DPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=296   MS=0.207993

GROUPING	MEAN	N	CONT
A	0.553125	16	2
A			
B A	0.450000	2	3
B			
B	0.185164	275	0
B			
B	0.110000	7	1

B183

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YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE PPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=296 MS=0.589367

GROUPING	MEAN	N	CONT
A	2.300000	2	3
B	0.971875	16	2
C	0.373636	275	0
C			
C	0.190000	7	1

B184

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE TRHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=296 MS=0.857921

GROUPING	MEAN	N	CONT
A	2.750000	2	3
A			
A	1.525000	16	2
B	0.574473	275	0
B			
B	0.300000	7	1

YR=76

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: EH

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	3	65156.85894357	21718.95298119	3.41	0.0176	0.028819	18.1127
ERROR	345	2195753.61097047	6364.50322020		STD DEV		EH MEAN
CORRECTED TOTAL	348	2260910.46991404			79.77783665		440.45272206

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
CONT	3	65156.85894357	3.41	0.0176	3	65156.85894357	3.41	0.0176

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE EH

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=345   MS=6364.5

GROUPING	MEAN	N	CONT
A	517.333333	3	3
A			
A	461.600000	10	1
A			
A	441.962025	316	0
B	394.500000	20	2

B187

YR=76

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: PH

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	3	0.86244194	0.28748065	1.28	0.2801	0.010953	6.7081
ERROR	347	77.88114780	0.22444135		STD DEV		PH MEAN
CORRECTED TOTAL	350	78.74358974			0.47375241		7.06239316

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
CONT	3	0.86244194	1.28	0.2801	3	0.86244194	1.28	0.2801

B188

VR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE PH

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=347 MS=0.224441

GROUPING	MEAN	N	CONT
A	7.266667	3	3
A	7.072642	318	0
A	7.050000	10	1
A	6.875000	20	2

YR=77

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
CENT	4	0 1 2 3

NUMBER OF OBSERVATIONS IN BY GROUP = 101

GROUP	OBS	DEPENDENT VARIABLES
1	58	AMMO
2	49	OPHOS PPHOS
3	57	EH PH
4	101	UPHOS
5	57	TPHOS

NOTE: VARIABLES IN EACH GROUP ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES.

B190

YR=77

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: AMMO

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	3	0.27189775	0.09063258	1.40	0.2461	0.042823	76.0643
ERROR	94	6.07750225	0.06465428		STD DEV		AMMO MEAN
CORRECTED TOTAL	97	6.34940000			0.25427206		0.33429571

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
CENT	3	0.27189775	1.40	0.2461	3	0.27189775	1.40	0.2461

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YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE AMMO

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=94   MS=.0646543

GROUPING	MEAN	N	CONT
A	0.380000	2	3
A			
A	0.345506	89	0
A			
A	0.275000	4	1
A			
A	0.050000	3	2

B192

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YR=77

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: DPHOS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	2	2.04299459	1.02149729	3.27	0.0469	0.124558	69.5189
ERROR	40	14.35894419	0.31215096		STD DEV		DPHOS MEAN
CORRECTED TOTAL	43	16.40193878			0.55870472		0.30367347

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
CONT	2	2.04299459	3.27	0.0469	2	2.04299459	3.27	0.0469

B193

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: PPHOS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	2	0.33737156	0.16868578	0.08	0.9197	0.003634	248.5080
ERROR	46	92.49551008	2.01077196		STD DEV		PPHOS MEAN
CORRECTED TOTAL	48	92.83288163			1.41801691		0.57061224

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
CONT	2	0.33737156	0.08	0.9197	2	0.33737156	0.08	0.9197

B194

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE DPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=46   MS=0.312151

GROUPING	MEAN	N	CONT
A	1.600000	3	2
B	0.756744	43	0
B			
B	0.680000	3	1

B195

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE PPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=46   MS=2.01077

GROUPING	MEAN	N	CONT
A	0.593488	43	0
A	0.566667	3	2
A	0.246667	3	1

YR=77

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: EH

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	2	2974.95681511	1487.47840756	0.07	0.9348	0.002494	32.0112
ERROR	54	1189713.35897436	22031.72886990		STD DEV		EH MEAN
CORRECTED TOTAL	56	1192688.31578947			148.43088920		463.68421053

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
CONT	2	2974.95681511	0.07	0.9348	2	2974.95681511	0.07	0.9348

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YR=77

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: PH

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	2	0.90503711	0.45251856	2.05	0.1391	0.070455	7.0984
ERROR	54	11.94057692	0.22112179		STD DEV		PH MEAN
CORRECTED TOTAL	56	12.84561404			0.47023589		6.62456140

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
CONT	2	0.90503711	2.05	0.1391	2	0.90503711	2.05	0.1391

B198

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE EH

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=54   MS=22031.7

GROUPING	MEAN	N	CONT
A	472.666667	3	1
A	464.576923	52	0
A	427.000000	2	3

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE PH

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=54 MS=0.221122

GROUPING	MEAN	N	CONT
A	7.100000	3	1
A	6.900000	2	3
A	6.586538	52	0

B200

YR=77

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: OPHOS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	3	0.53974888	0.17991629	0.45	0.7193	0.013828	112.8107
ERROR	97	38.49319766	0.39683709		STD DEV		OPHOS MEAN
CORRECTED TOTAL	100	39.03294653			0.62995007		0.55841584

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
CONT	3	0.53974888	0.45	0.7193	3	0.53974888	0.45	0.7193

B201

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE OPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=97   MS=0.396837

GROUPING	MEAN	N	CONT
A	0.706667	3	2
A	0.614000	5	1
A	0.560989	91	0
A	0.080000	2	3

B202

YR=77

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: TPHOS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	3	4.66574888	1.55524963	1.55	0.2102	0.080839	93.5487
ERROR	53	53.05073533	1.00095727		STD DEV		TPHOS MEAN
CORRECTED TOTAL	56	57.71648421			1.00047852		1.06947368

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
CONT	3	4.66574888	1.55	0.2102	3	4.66574888	1.55	0.2102

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE TPHGS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=53   MS=1.00096

GROUPING	MEAN	N	CONT
A	2.166667	3	2
A	1.031400	50	0
A	0.926667	3	1
A	0.110000	1	3

B204

YR=76

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
CENT	4	0 1 2 3

NUMBER OF OBSERVATIONS IN BY GROUP = 367

GROUP	OBS	DEPENDENT VARIABLES
1	347	NITA
2	321	TNIT
3	323	DNIT
4	296	PNIT

NOTE: VARIABLES IN EACH GROUP ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES.

B205

YR=76

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: NITA

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	3	0.69418277	0.23139426	0.61	0.6161	0.005235	135.2306
ERROR	345	131.909.7654	0.38234544		STD DEV		NITA MEAN
CORRECTED TOTAL	348	132.60335931			0.61834088		0.45724928

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
CONT	3	0.69418277	0.61	0.6161	3	0.69418277	0.61	0.6161

B206

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YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE NITA

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=345 MS=0.382345

GROUPING	MEAN	N	CONT
A	0.466378	312	0
A	0.461250	24	2
A	0.246667	3	3
A	0.226000	10	1

B207

YR=76

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: TNIT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	3	136.20107678	45.40035893	9.79	0.0001	0.084809	92.5826
ERROR	317	1469.76736122	4.63649010		STD DEV		TNIT MEAN
CORRECTED TOTAL	320	1605.96843801			2.15325105		2.32576324

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
CONT	3	136.20107678	9.79	0.0001	3	136.20107678	9.79	0.0001

B208

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE TNIT

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=317   MS=4.63649

GROUPING	MEAN	N	CONT
A	7.800000	3	3
B	3.773684	19	2
C	2.179897	290	0
C			
C	2.144444	9	1

B209

YR=76

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: UNIT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	3	49.79941383	16.59980461	14.74	0.0001	0.121725	75.4159
ERROR	319	359.31358864	1.12637489		STD DEV		UNIT MEAN
CORRECTED TOTAL	322	409.11300248			1.06130810		1.40727554

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
CONT	3	49.79941383	14.74	0.0001	3	49.79941383	14.74	0.0001

B210

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   0:34 SUNDAY, MARCH 5, 1978   7

YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE DNIT

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=319   MS=1.12637

GROUPING		MEAN	N	CONT
	A	4.466667	3	3
	B	2.393684	19	2
C	B	1.577778	9	1
C		1.306404	292	0

B211

YR=76

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: PNIT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	3	12.87471514	4.29157171	1.57	0.1956	0.015855	180.3295
ERROR	292	799.15818182	2.73684309		STD DEV		PNIT MEAN
CORRECTED TOTAL	295	812.03289696			1.65434068		0.91739865

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
CONT	3	12.87471514	1.57	0.1956	3	12.87471514	1.57	0.1956

B212

AD-A062 867 GEORGIA UNIV BRUNSWICK MARINE EXTENSION SERVICE F/G 13/2
HABITAT DEVELOPMENT FIELD INVESTIGATIONS BUTTERMILK SOUND MARSH--ETC(U)
JUL 78 R J REIMOLD, M A HARDISKY, P C ADAMS DACW21-75-C-0074
UNCLASSIFIED WES-TR-D-78-26-APP-A NL

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ADA
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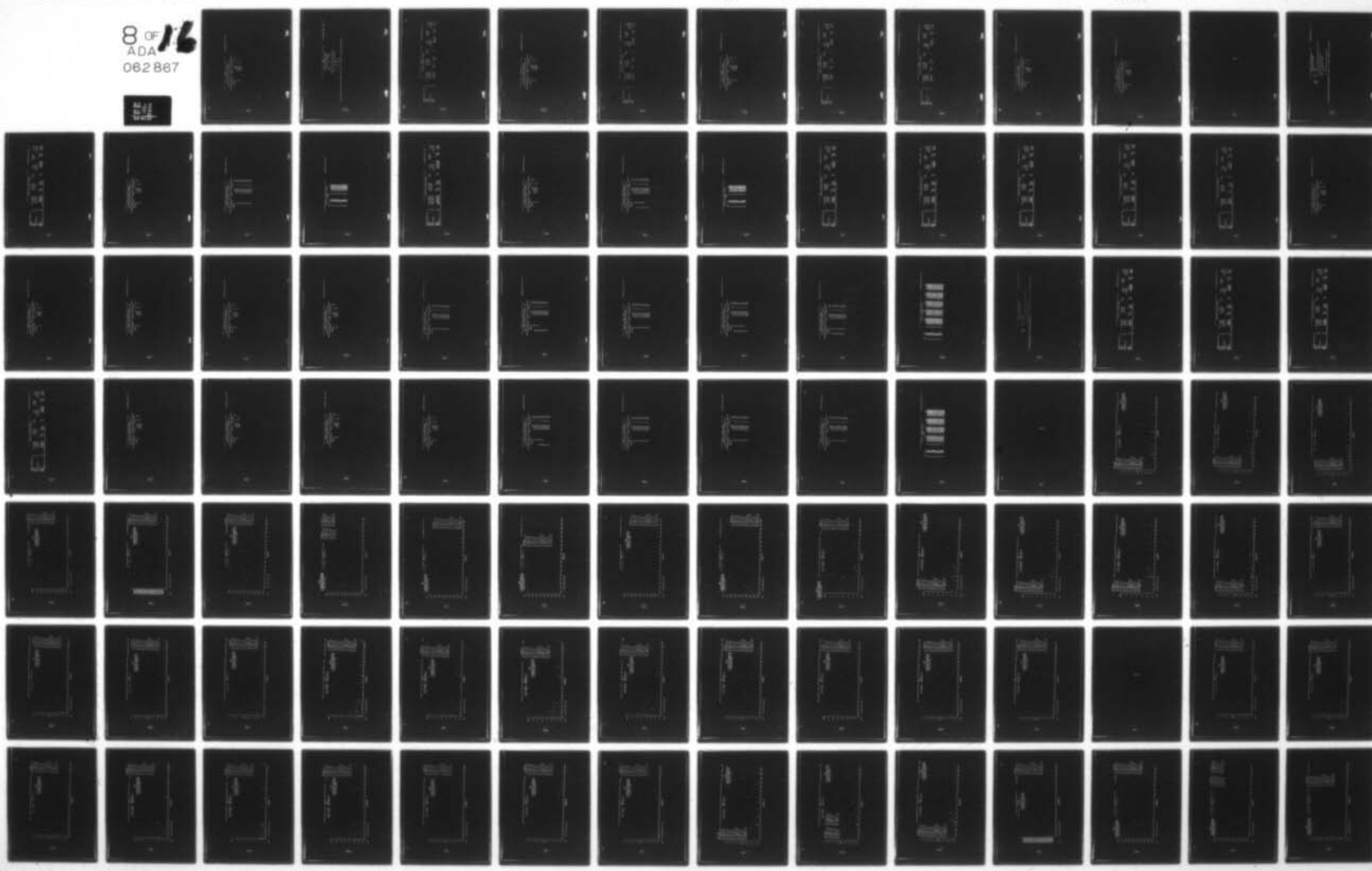

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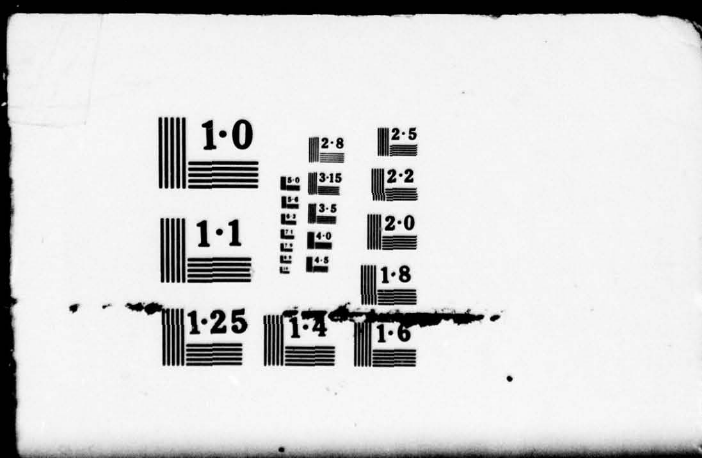
ADA
062867



YR=76

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE PNIT

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=292   MS=2.73684

GROUPING	MEAN	N	CONT
A	1.927273	11	2
A	1.200000	2	3
A	0.886364	275	0
A	0.525000	8	1

YR=77

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
CCNT	4	0 1 2 3

NUMBER OF OBSERVATIONS IN BY GROUP = 99

GROUP	OBS	DEPENDENT VARIABLES
1	99	NITA
2	50	TNIT
3	45	ONIT PNIT

NOTE: VARIABLES IN EACH GROUP ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES.

B214

YR=77

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: NITA

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	3	0.01378428	0.00459476	0.12	0.9438	0.003780	128.5433
ERROR	95	3.63247026	0.03823653		STD DEV		NITA MEAN
CORRECTED TOTAL	98	3.64625455			0.19554163		0.15212121

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
CONT	3	0.01378428	0.12	0.9438	3	0.01378428	0.12	0.9438

B215

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VK=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE NITA

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=95   MS=.0382365

GROUPING	MEAN	N	CONT
A	0.153933	89	0
A	0.153333	3	2
A	0.152000	5	1
A	0.070000	2	3

B216

STATISTICAL ANALYSIS SYSTEM   0:34 SUNDAY, MARCH 5, 1978   13

YR=77

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: TNIT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	3	0.50211770	0.16737257	1.12	0.3520	0.067899	49.3247
ERROR	46	6.89293030	0.14984631		STD DEV		TNIT MEAN
CORRECTED TOTAL	49	7.39504800			0.38709987		0.78480000

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
CONT	3	0.50211770	1.12	0.3520	3	0.50211770	1.12	0.3520

B217

VR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE TNIT

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=46   MS=0.149846

GROUPING	MEAN	N	CONT
A	0.846667	3	1
A	0.804091	44	0
A	0.720000	1	3
A	0.300000	2	2

B218

YR=77

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: UNIT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	2	0.29048892	0.14524446	2.14	0.1299	0.090568	46.7817
ERROR	43	2.91692195	0.06783539		STD DEV		UNIT MEAN
CORRECTED TOTAL	45	3.20741087			0.26045229		0.55673913

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
CCNT	2	0.29048892	2.14	0.1299	2	0.29048892	2.14	0.1299

B219

YR=77

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: PNIT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	2	0.04386907	0.02193454	0.38	0.6883	0.017223	101.6366
ERROR	43	2.50321789	0.05821437		STD DEV		PNIT MEAN
CORRECTED TOTAL	45	2.54708696			0.24127654		0.23739130

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
CUNT	2	0.04386907	0.38	0.6883	2	0.04386907	0.38	0.6883

B220

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE DNIT

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=43   MS=.0678354

GROUPING	MEAN	N	CONT
A	0.660000	3	1
A			
A	0.566585	41	0
A			
A	0.200000	2	2

YR=77

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE PNIT

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=43   MS=.0582144

GROUPING	MEAN	N	CONT
A	0.246341	41	0
A			
A	0.206667	3	1
A			
A	0.100000	2	2

PART 4

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                GENERAL LINEAR MODELS PROCEDURE
                   CLASS LEVEL INFORMATION
CLASS     LEVELS    VALUES
ZONE        3       1 2 3
TIME       11       700 730 800 830 900 930 1000 1030 1100 1130 1200

             NUMBER OF OBSERVATIONS IN DATA SET = 144

            GROUP    OBS    DEPENDENT VARIABLES
              1      133    PH
              2      132    EH
              3      138    OPHOS TPHOS DPHOS PPHOS AMMO

NOTE: VARIABLES IN EACH GROUP ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES.
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B224

STATISTICAL ANALYSIS SYSTEM   3:40 SUNDAY, MARCH 5, 1978   2

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: PH

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	21	5.96412928	0.28400616	0.54	0.9456	0.093222	10.1490
ERROR	111	58.01361508	0.52264518		STD DEV		PH MEAN
CORRECTED TOTAL	132	63.97774436			0.72294203		7.12330827

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
ZONE	2	1.38680802	1.33	0.2695	2*	0.91200170	0.87	0.4208
TIME	10	2.08162899	0.40	0.9449	10*	1.27848640	0.24	0.9908
ZONE*TIME	9	2.49569227	0.53	0.8503	9	2.49569227	0.53	0.8503

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

B225

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE PH

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=111 MS=0.522645

GROUPING	MEAN	N	ZONE
A	7.273333	15	1
A	7.189062	64	3
A	7.003704	54	2

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE PH

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=111 MS=0.522645

GROUPING	MEAN	N	TIME
A	7.300000	3	700
A	7.283333	6	800
A	7.283333	12	1200
A	7.257143	14	930
A	7.187500	8	830
A	7.185714	7	730
A	7.155556	18	1100
A	7.126667	15	1000
A	7.089474	19	1030
A	6.978571	14	900
A	6.876471	17	1130

GENERAL LINEAR MODELS PROCEDURE

MEANS

ZONE	TIME	N	PH
1	1030	4	7.10000000
1	1100	3	7.10000000
1	1130	4	7.42500000
1	1200	4	7.42500000
2	900	5	6.88000000
2	930	7	7.21428571
2	1000	9	7.11111111
2	1030	9	7.07777778
2	1100	9	7.12222222
2	1130	9	6.45555556
2	1200	6	7.23333333
3	700	3	7.30000000
3	730	7	7.18571429
3	800	6	7.28333333
3	830	8	7.18750000
3	900	9	7.03333333
3	930	7	7.30000000
3	1000	6	7.15000000
3	1030	6	7.10000000
3	1100	6	7.23333333
3	1130	4	7.27500000
3	1200	2	7.15000000

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: EH

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	21	39235.31854257	1868.34850203	1.83	0.0238	0.258758	8.2767
ERROR	110	112394.15873016	1021.76507937		STD DEV		EH MEAN
CORRECTED TOTAL	131	151629.47727273			31.96506029		386.20454545

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
ZONE	2	13354.61711156	6.54	0.0021	2*	2027.78553957	0.99	0.3740
TIME	10	24032.37671522	2.35	0.0147	10*	21018.01143268	2.06	0.0341
ZONE*TIME	9	1848.32471578	0.20	0.9929	9	1848.32471578	0.20	0.9929

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE EH

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=110   MS=1021.77

GROUPING	MEAN	N	ZONE
A	396.359375	64	3
B	378.150943	53	2
B			
B	371.333333	15	1

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE EH

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=110 MS=1021.77

GROUPING		MEAN	N	TIME
	A	441.142857	7	730
	B	401.142857	14	900
C	B	399.000000	6	800
C	B	395.250000	8	830
C	B	385.071429	14	930
C	B	383.473684	19	1030
C	B	380.944444	18	1100
C	B	376.666667	15	1000
C		374.000000	16	1130
C		372.333333	12	1200
C		361.000000	3	700

GENERAL LINEAR MODELS PROCEDURE

MEANS

ZONE	TIME	N	EH
1	1030	4	371.500000
1	1100	3	384.000000
1	1130	4	371.500000
1	1200	4	361.500000
2	900	5	396.000000
2	930	7	381.142857
2	1000	9	370.111111
2	1030	9	382.333333
2	1100	9	372.888889
2	1130	8	376.500000
2	1200	6	375.666667
3	700	3	361.000000
3	730	7	441.142857
3	800	6	399.000000
3	830	8	395.250000
3	900	9	404.000000
3	930	7	389.000000
3	1000	6	386.500000
3	1030	6	393.166667
3	1100	6	391.500000
3	1130	4	371.500000
3	1200	2	384.000000

B232

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: OPHOS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	21	1.07118816	0.05100896	1.17	0.2917	0.174598	156.4481
ERROR	116	5.06397198	0.04365493		STD DEV		OPHOS MEAN
CORRECTED TOTAL	137	6.13516014			0.20893762		0.13355072

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
ZONE	2	0.72648581	8.32	0.0004	2*	0.23823979	2.73	0.0695
TIME	10	0.19554289	0.45	0.9194	10*	0.26275365	0.60	0.8095
ZONE*TIME	9	0.14915946	0.38	0.9425	9	0.14915946	0.38	0.9425

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

B233

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: TPHOS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	21	15.03490996	0.71594809	1.57	0.0682	0.221479	150.5041
ERROR	116	52.84907048	0.45559544		STD DEV		TPHOS MEAN
CORRECTED TOTAL	137	67.88398043			0.67497810		0.44847826

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
ZONE	2	6.98179436	7.66	0.0007	2*	1.49421377	1.64	0.1985
TIME	10	2.75596606	0.60	0.8070	10*	4.97890822	1.09	0.3735
ZONE*TIME	9	5.29714953	1.29	0.2481	9	5.29714953	1.29	0.2481

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

B234

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: DPHOS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	21	1.01994315	0.04856872	1.08	0.3782	0.163630	114.3682
ERROR	116	5.21328873	0.04494214		STD DEV		DPHOS MEAN
CORRECTED TOTAL	137	6.23323188			0.21199562		0.18536232

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
ZONE	2	0.62472929	6.95	0.0014	2*	0.11696128	1.30	0.2761
TIME	10	0.26694049	0.59	0.8161	10*	0.30133475	0.67	0.7497
ZONE*TIME	9	0.12827337	0.32	0.9673	9	0.12827337	0.32	0.9673

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: PPHOS

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	21	11.19584010	0.53313524	1.44	0.1154	0.206383	230.5848
ERROR	116	43.05212222	0.37113898		STD DEV		PPHOS MEAN
CORRECTED TOTAL	137	54.24796232			0.60921177		0.26420290

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
ZONE	2	3.98982688	5.38	0.0059	2*	1.07719078	1.45	0.2385
TIME	10	2.30046891	0.62	0.7944	10*	4.31301951	1.16	0.3235
ZONE*TIME	9	4.90554431	1.47	0.1671	9	4.90554431	1.47	0.1671

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

STATISTICAL ANALYSIS SYSTEM 3:40 SUNDAY, MARCH 5, 1978 14

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: AMMO

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	21	0.29986765	0.01427941	1.97	0.0124	0.262879	81.8757
ERROR	116	0.84084032	0.00724862		STD DEV		AMMO MEAN
CORRECTED TOTAL	137	1.14070797			0.08513885		0.10399551

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
ZONE	2	0.06554857	4.52	0.0129	2*	0.05252270	3.62	0.0298
TIME	10	0.14054417	1.94	0.0466	10*	0.13146412	1.81	0.0656
ZONE*TIME	9	0.09377491	1.44	0.1795	9	0.09377491	1.44	0.1795

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE DPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=116   MS=.0436549

GROUPING	MEAN	N	ZONE
A	0.267333	15	1
A			
A	0.183704	54	2
B	0.065217	69	3

B238

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE TPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=116   MS=0.455595

GROUPING	MEAN	N	ZONE
A	1.066667	15	1
B	0.448704	54	2
B			
B	0.313913	59	3

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE DPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=116   MS=.0449421

GROUPING	MEAN	N	ZONE
A	0.317333	15	1
A			
A	0.227963	54	2
B	0.123333	69	3

B240

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   3:40 SUNDAY, MARCH 5, 1978   18

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE PPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=116   MS=0.371139

GROUPING	MEAN	N	ZONE
A	0.749333	15	1
B	0.222407	54	2
B			
B	0.191449	69	3

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   3:40 SUNDAY, MARCH 5, 1978   19

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE AMMO

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=116   MS=.0072486

GROUPING	MEAN	N	ZONE
A	0.165333	15	1
B	0.101296	54	2
B			
B	0.092754	69	3

B242

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   3:40 SUNDAY, MARCH 5, 1978   20

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE OPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=116   MS=.0436549

GROUPING	MEAN	N	TIME
A	0.235833	12	1200
A	0.195000	18	1100
A	0.177647	17	1130
A	0.175000	20	1030
A	0.156250	16	1000
A	0.067500	8	800
A	0.063333	3	700
A	0.055429	14	930
A	0.055714	7	730
A	0.050714	14	900
A	0.050000	9	830

B243

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE TPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=115   MS=0.455595

GROUPING		MEAN	N	TIME
	A	0.870588	17	1130
B	A	0.633333	12	1200
B	A	0.605000	20	1030
B	A	0.438333	18	1100
B	A	0.369286	14	930
B		0.274286	14	900
B		0.268125	16	1000
B		0.265556	9	830
B		0.237500	8	800
B		0.196667	3	700
B		0.188571	7	730

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE DPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=116   MS=.0449421

GROUPING	MEAN	N	TIME
A	0.300000	12	1200
A	0.248333	18	1100
A	0.243000	20	1030
A	0.239412	17	1130
A	0.178125	16	1000
A	0.114286	7	730
A	0.114286	14	930
A	0.108571	14	900
A	0.092222	9	830
A	0.090000	8	800
A	0.086667	3	700

B245

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE PPHOS

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=115   MS=0.371139

GROUPING		MEAN	N	TIME
	A	0.631176	17	1130
B	A	0.366500	20	1030
B	A	0.333333	12	1200
B	A	0.255000	14	930
B	A	0.190000	18	1100
B	A	0.173333	9	830
B	A	0.165714	14	900
B	A	0.155000	8	800
B	A	0.110000	3	700
B		0.090000	16	1000
B		0.074286	7	730

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE AMMO

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=116   MS=.0072486

GROUPING		MEAN	N	TIME
	A	0.226667	3	700
B	A	0.161429	7	730
B	A	0.135294	17	1130
B	C	0.106111	18	1130
B	C	0.105500	20	1030
B	C	0.103333	12	1200
B	C	0.100000	8	800
B	C	0.096429	14	930
B	C	0.095000	16	1000
B	C	0.073333	9	830
	C	0.046429	14	900

GENERAL LINEAR MODELS PROCEDURE

MEANS

ZONE	TIME	N	OPHOS	TPHOS	DPHOS	PPHOS	AMMO
1	1030	4	0.30500000	0.95000000	0.34750000	0.60250000	0.09250000
1	1100	3	0.36666667	0.73333333	0.40000000	0.33333333	0.11666667
1	1130	4	0.20500000	1.90000000	0.29250000	1.60750000	0.28500000
1	1200	4	0.21750000	0.60000000	0.25000000	0.35000000	0.15500000
2	900	5	0.07400000	0.42800000	0.12800000	0.30000000	0.03800000
2	930	7	0.06857143	0.58571429	0.14571429	0.44000000	0.12857143
2	1000	9	0.23111111	0.33222222	0.24000000	0.09222222	0.10000000
2	1030	9	0.16888889	0.35555556	0.22444444	0.14111111	0.12111111
2	1100	9	0.20333333	0.47777778	0.25222222	0.22555556	0.11444444
2	1130	9	0.21555556	0.41111111	0.24444444	0.16666667	0.09444444
2	1200	6	0.25333333	0.63333333	0.33333333	0.30000000	0.08500000
3	700	3	0.06333333	0.19666667	0.08666667	0.11000000	0.22666667
3	730	7	0.05571429	0.18857143	0.11428571	0.07428571	0.16142857
3	800	8	0.06750000	0.23750000	0.09000000	0.15500000	0.10000000
3	830	9	0.05000000	0.26555556	0.09222222	0.17333333	0.07333333
3	900	9	0.03777778	0.18888889	0.09777778	0.09111111	0.05111111
3	930	7	0.04428571	0.15285714	0.08285714	0.07000000	0.06428571
3	1000	7	0.06000000	0.18571429	0.09857143	0.08714286	0.08857143
3	1030	7	0.08285714	0.72857143	0.20714286	0.52142857	0.09285714
3	1100	6	0.09666667	0.23166667	0.16666667	0.06500000	0.08833333
3	1130	4	0.06500000	0.87500000	0.17500000	0.70000000	0.07750000
3	1200	2	0.22000000	0.70000000	0.30000000	0.40000000	0.05500000

B248

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   3:44 SUNDAY, MARCH 5, 1978   1

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
ZONE	3	1 2 3
TIME	11	700 730 800 830 900 930 1000 1030 1100 1130 1200

NUMBER OF OBSERVATIONS IN DATA SET = 144

NOTE: ALL DEPENDENT VARIABLES ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER, ONLY 138 OBSERVATIONS IN DATA SET CAN BE USED IN THIS ANALYSIS.

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: NITA

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	22	0.86673102	0.03939686	2.30	0.0023	0.305708	55.2300
ERROR	115	1.96842913	0.01711678		STD DEV		NITA MEAN
CORRECTED TOTAL	137	2.83516014			0.13083109		0.23688406

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
ZONE	2	0.60267095	17.60	0.0001	2*	0.13550024	3.96	0.0218
TIME	10	0.13240661	0.77	0.6539	10*	0.20344895	1.19	0.3058
ZONE*TIME	10	0.13165346	0.77	0.6581	10	0.13165346	0.77	0.6581

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

B250

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: TNIT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	22	7.11202761	0.32327398	0.67	0.8628	0.113204	49.0813
ERROR	115	55.71268254	0.48445811		STD DEV		TNIT MEAN
CORRECTED TOTAL	137	62.82471014			0.69603025		1.41811594

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
ZONE	2	0.97055328	1.00	0.3704	2*	0.90651414	0.94	0.3953
TIME	10	1.90880529	0.39	0.9470	10*	2.07154282	0.43	0.9306
ZONE*TIME	10	4.23266903	0.87	0.5599	10	4.23266903	0.87	0.5599

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: UNIT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	22	2.63712250	0.11986920	0.87	0.6275	0.143290	41.4421
ERROR	115	15.76700794	0.13710442		STD DEV		UNIT MEAN
CORRECTED TOTAL	137	18.40413043			0.37027614		0.89347826

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
ZONE	2	0.51997357	1.90	0.1548	2*	0.18899694	0.69	0.5040
TIME	10	1.30976802	0.96	0.4862	10*	1.17694567	0.86	0.5740
ZONE*TIME	10	0.80738091	0.59	0.8203	10	0.80738091	0.59	0.8203

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: PNIT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	22	6.10813665	0.27764257	0.77	0.7570	0.128225	114.5414
ERROR	115	41.52809524	0.36111387		STD DEV		PNIT MEAN
CORRECTED TOTAL	137	47.63623188			0.60092751		0.52463768

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
ZONE	2	0.50160443	0.69	0.5014	2*	0.85074565	1.18	0.3116
TIME	10	1.94969255	0.54	0.8586	10*	2.15616582	0.60	0.8135
ZONE*TIME	10	3.65683966	1.01	0.4372	10	3.65683966	1.01	0.4372

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE NITA

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=115   MS=.0171168

GROUPING	MEAN	N	ZONE
A	0.299412	68	3
B	0.193636	55	2
C	0.112000	15	1

B254

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE TNIT

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=115   MS=0.484458

GROUPING	MEAN	N	ZONE
A	1.553333	15	1
A	1.467647	68	3
A	1.320000	55	2

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE DNIT

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=115   MS=0.137104

GROUPING	MEAN	N	ZONE
A	1.066667	15	1
A	0.882353	68	3
A	0.860000	55	2

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE PNIT

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=115 MS=0.361114

GROUPING	MEAN	N	ZONE
A	0.585294	68	3
A	0.486667	15	1
A	0.460000	55	2

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE NITA

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=115   MS=.0171168

GROUPING		MEAN	N	TIME
	A	0.413333	3	700
	A	0.354286	7	730
	A	0.328750	8	800
B	A	0.281429	14	900
B	A	0.262222	9	830
B	A	0.257143	14	930
B	A	0.238750	16	1000
B		0.201500	20	1030
B		0.195000	18	1100
B		0.175294	17	1130
B		0.175000	12	1200

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   3:44 SUNDAY, MARCH 5, 1978   11

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE TNIT

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=115   MS=0.484458

GROUPING	MEAN	N	TIME
A	1.633333	3	700
A	1.594118	17	1130
A	1.490000	20	1030
A	1.478571	14	930
A	1.412500	16	1000
A	1.377778	9	830
A	1.377778	18	1100
A	1.371429	7	730
A	1.342857	14	900
A	1.266667	12	1200
A	1.225000	8	800

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE UNIT

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=115   MS=0.137104

GROUPING	MEAN	N	TIME
A	1.300000	3	700
A	0.995000	20	1030
A	0.962500	16	1000
A	0.916667	18	1100
A	0.914286	7	730
A	0.905882	17	1130
A	0.850000	8	800
A	0.833333	9	830
A	0.791667	12	1200
A	0.785714	14	900
A	0.785714	14	930

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STATISTICAL ANALYSIS SYSTEM

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE PNIT

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=115 MS=0.361114

GROUPING	MEAN	N	TIME
A	0.692857	14	930
A	0.688235	17	1130
A	0.557143	14	900
A	0.544444	9	830
A	0.480000	20	1030
A	0.477778	18	1100
A	0.475000	12	1200
A	0.457143	7	730
A	0.450000	16	1000
A	0.375000	8	800
A	0.333333	3	700

GENERAL LINEAR MODELS PROCEDURE

MEANS

ZONE	TIME	N	NITA	TNIT	DNIT	PNIT
1	1030	4	0.13250000	1.52500000	1.20000000	0.25000000
1	1100	3	0.05666667	1.36666667	1.06666667	0.40000000
1	1130	4	0.12250000	1.75000000	1.10000000	0.65000000
1	1200	4	0.12250000	1.52500000	0.93000000	0.62500000
2	800	1	0.36000000	1.00000000	0.70000000	0.30000000
2	900	5	0.18400000	1.42000000	0.92000000	0.50000000
2	930	7	0.22142857	1.67142857	0.87142857	0.80000000
2	1000	9	0.20555556	1.42222222	1.00000000	0.42222222
2	1030	9	0.18333333	1.21111111	0.88888889	0.32222222
2	1100	9	0.17222222	1.24444444	0.78888889	0.45555556
2	1130	9	0.15000000	1.25555556	0.87777778	0.37777778
2	1200	6	0.23666667	1.10000000	0.65000000	0.45000000
3	700	3	0.41333333	1.63333333	1.30000000	0.33333333
3	730	7	0.35428571	1.37142857	0.91428571	0.45714286
3	800	7	0.32428571	1.25714286	0.87142857	0.38571429
3	830	9	0.26222222	1.37777778	0.83333333	0.54444444
3	900	9	0.33555556	1.30000000	0.71111111	0.58888889
3	930	7	0.25285714	1.28571429	0.70000000	0.58571429
3	1000	7	0.28142857	1.40000000	0.91428571	0.48571429
3	1030	7	0.26428571	1.82857143	1.01428571	0.81428571
3	1100	6	0.25833333	1.58333333	1.03333333	0.55000000
3	1130	4	0.28500000	2.20000000	0.77500000	1.42500000
3	1200	2	0.09500000	1.25000000	1.00000000	0.25000000

PART 5

21:09 SATURDAY, MARCH 4, 1978

MEAN CONCENTRATION OF AMMONIA AND ORTHO PHOSPHATE IN INTERSTITIAL WATER

ZONE=1

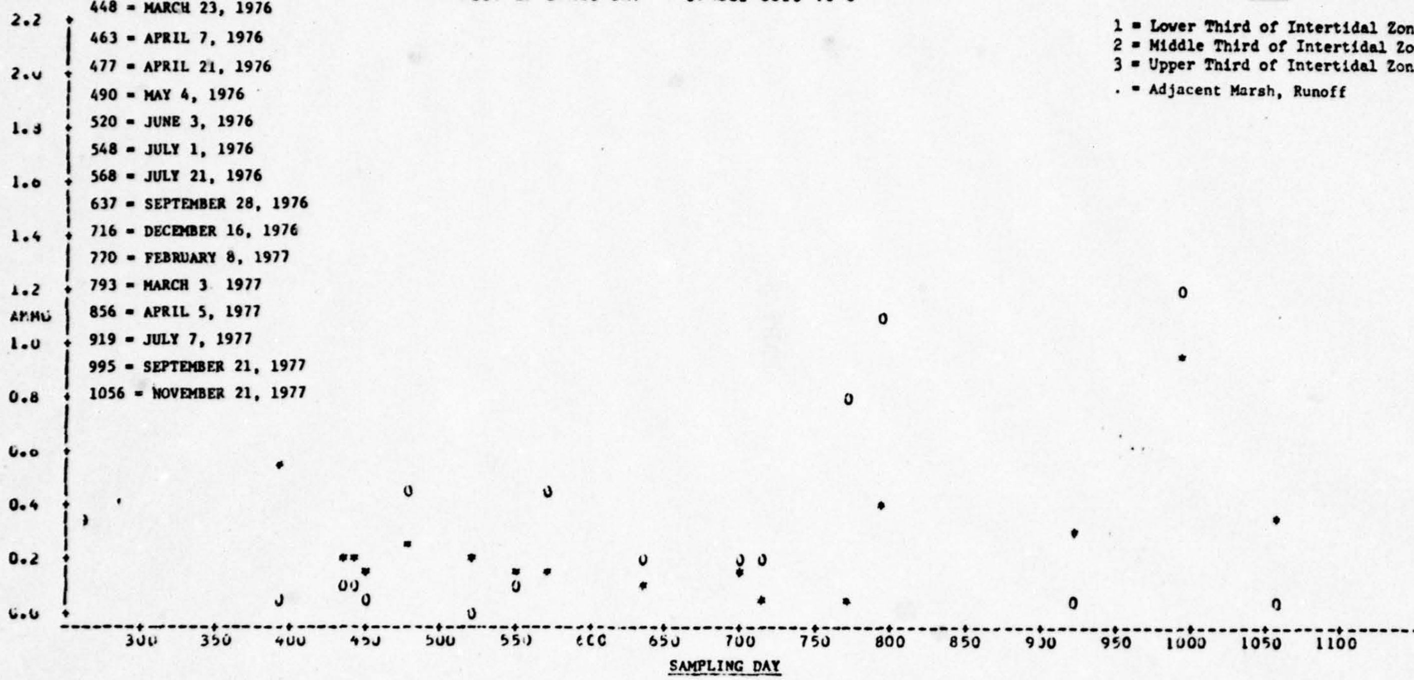
PLOT OF AMMO*DAY SYMBOL USED IS *
PLOT OF OPHOS*DAY SYMBOL USED IS 0

SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16. 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
490 = MAY 4, 1976
520 = JUNE 3, 1976
548 = JULY 1, 1976
568 = JULY 21, 1976
637 = SEPTEMBER 28, 1976
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone
. = Adjacent Marsh, Runoff



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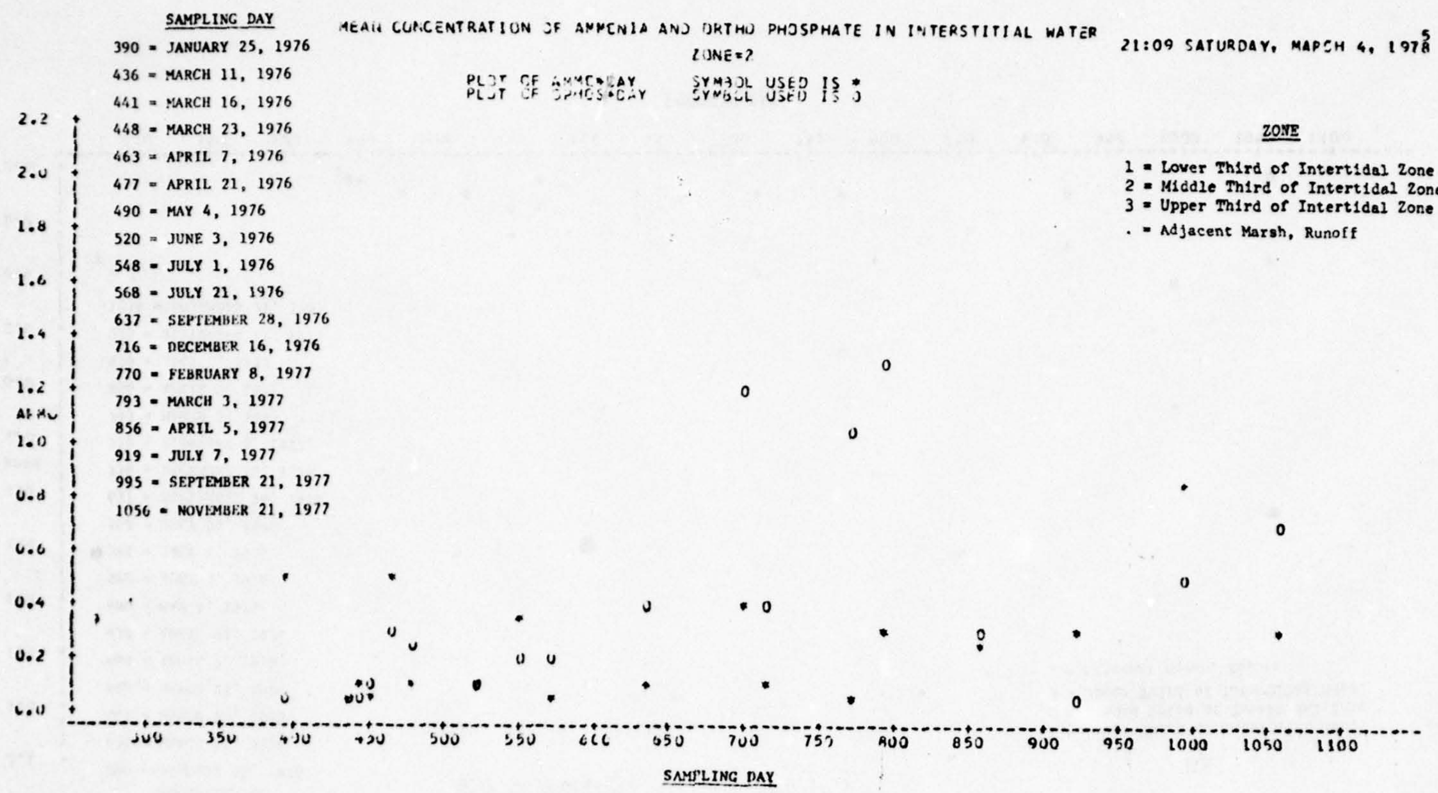
MEAN CONCENTRATION OF AMMONIA AND ORTHO PHOSPHATE IN INTERSTITIAL WATER 21:09 SATURDAY, MARCH 4, 1978 5

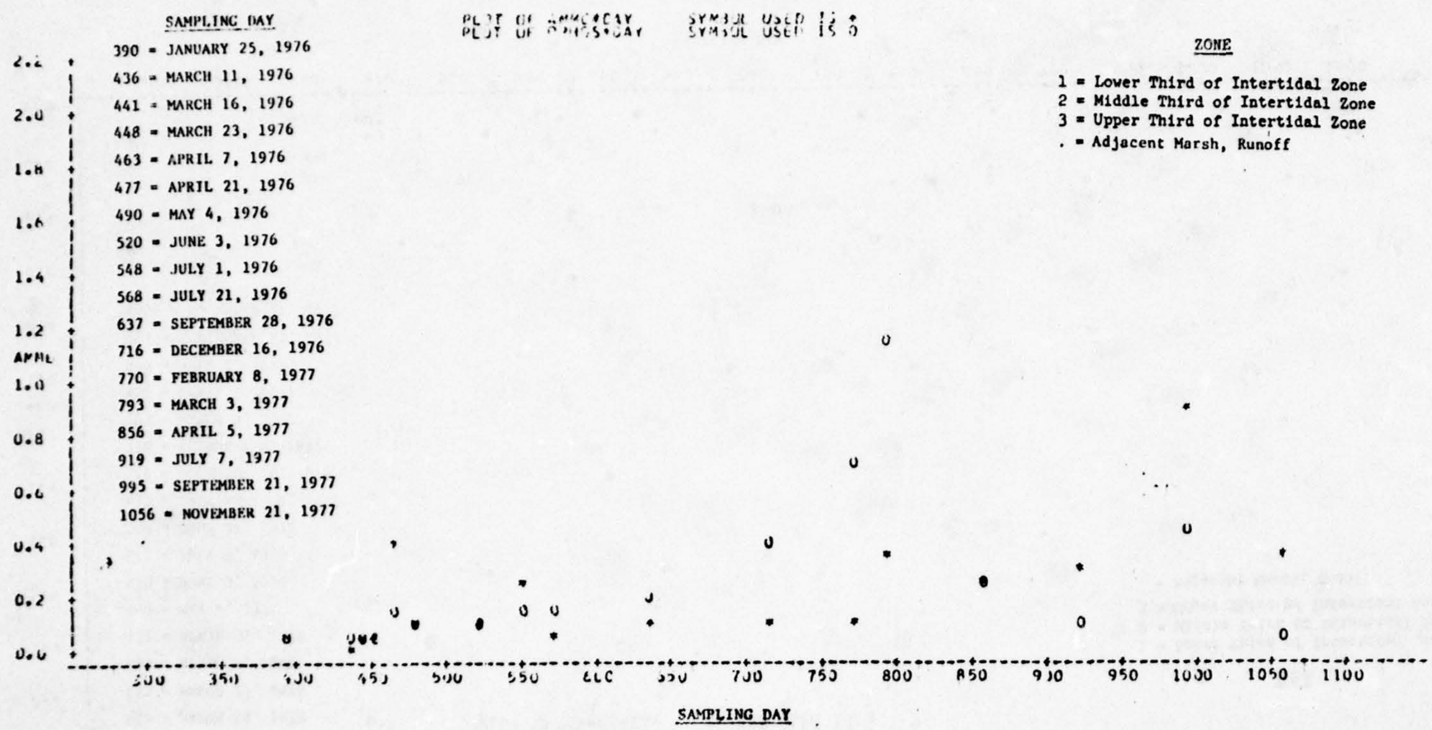
ZONE=2

PLOT OF AMMO*DAY SYMBOL USED IS *
PLOT OF OPHOS*DAY SYMBOL USED IS O



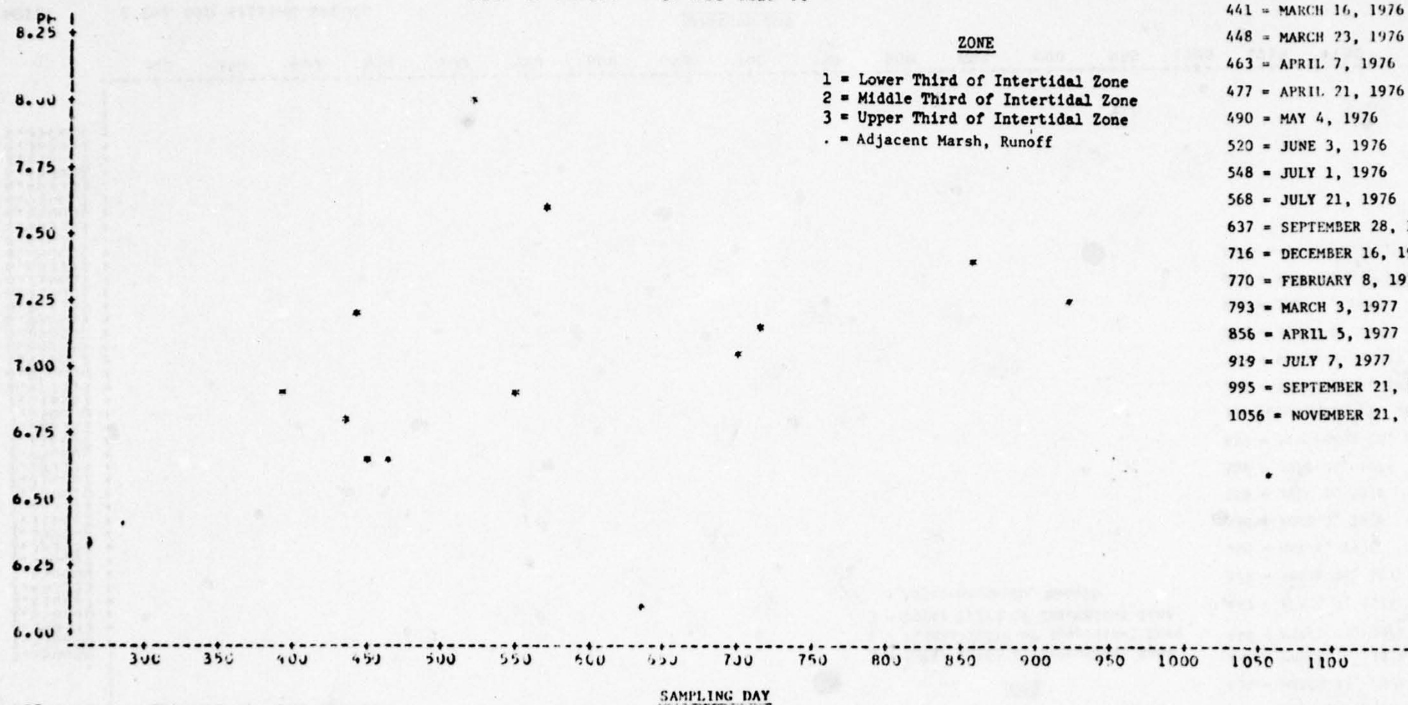
MEAN CONCENTRATION OF AMMONIA AND ORTHO PHOSPHATE IN INTERSTITIAL WATER 21:09 SATURDAY, MARCH 4, 1978

ZONE=3



PH OF BUTTERMILK SOUND INTERSTITIAL WATER ZONE=. 21:09 SATURDAY

PLOT OF PH*DAY SYMBOL USED IS *



NOTE: 4 OBS HAD MISSING VALUES

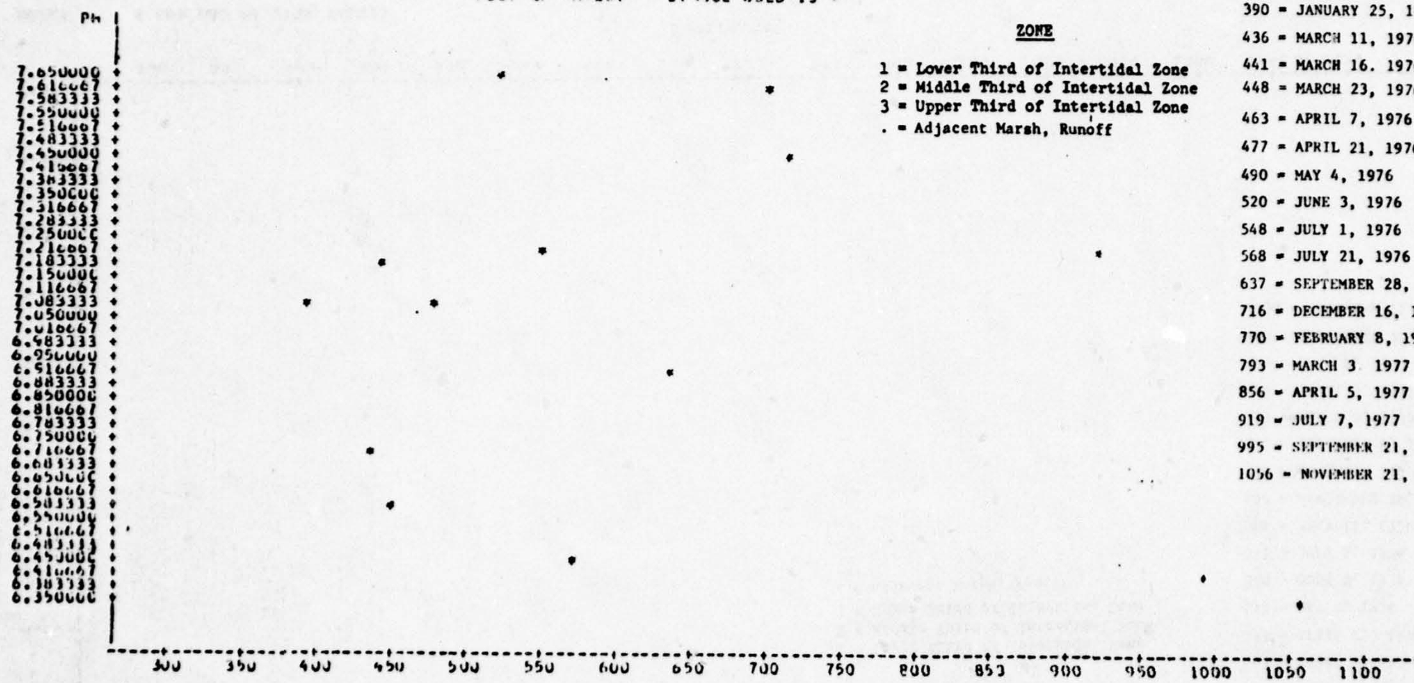
SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16, 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
490 = MAY 4, 1976
520 = JUNE 3, 1976
548 = JULY 1, 1976
568 = JULY 21, 1976
637 = SEPTEMBER 28, 1976
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3, 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

PH OF BUTTERMILK SOUND INTERSTITIAL WATER
ZONE=1

21:09 SATURDAY, MARCH 4, 1978 8

PLOT OF PH*DAY SYMBOL USED IS *



SAMPLING DAY

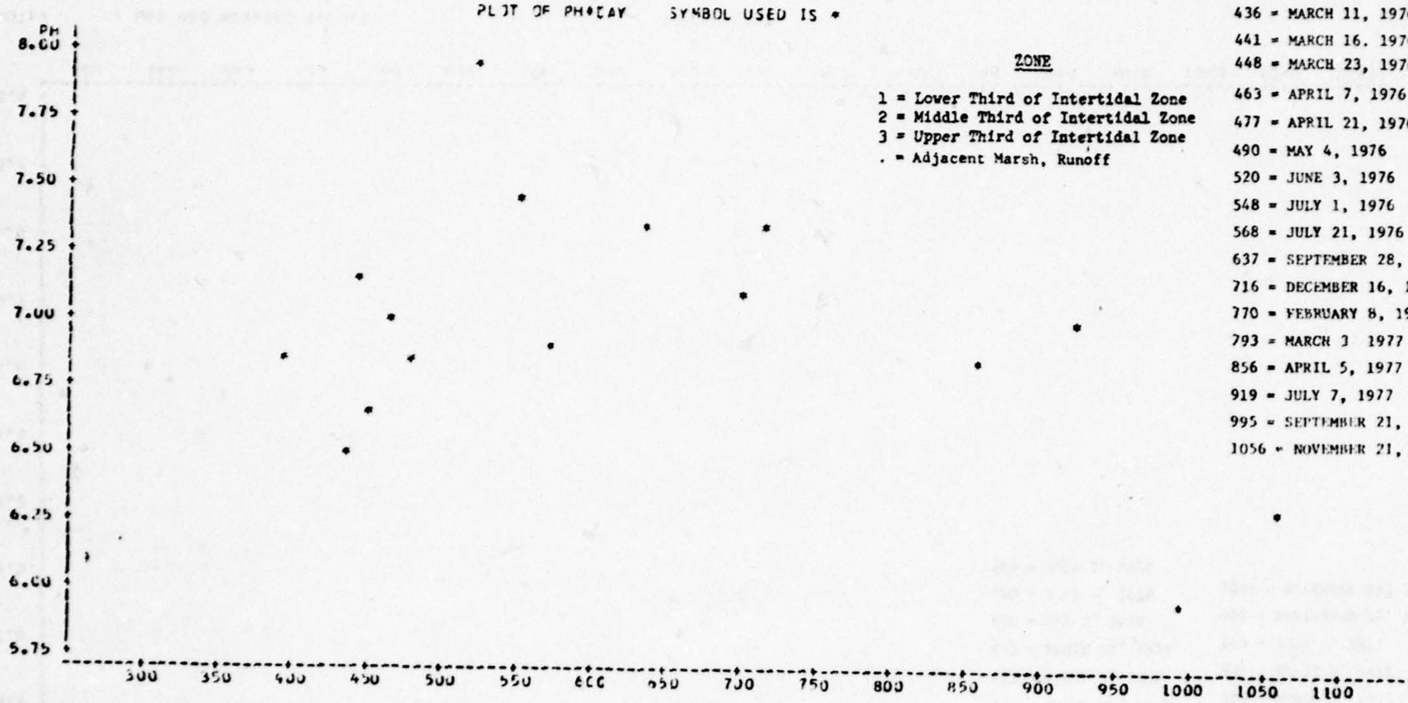
390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16, 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
490 = MAY 4, 1976
520 = JUNE 3, 1976
548 = JULY 1, 1976
568 = JULY 21, 1976
637 = SEPTEMBER 28, 1976
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

NOTE: 2 OBS HAD MISSING VALUES

PH OF BUTTERMILK SOUND INTERSTITIAL WATER
ZONE=2

21:09 SATURDAY,

PLOT OF PH*DAY   SYMBOL USED IS *



ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone
. = Adjacent Marsh, Runoff

SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16. 1976
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463 = APRIL 7, 1976
477 = APRIL 21, 1976
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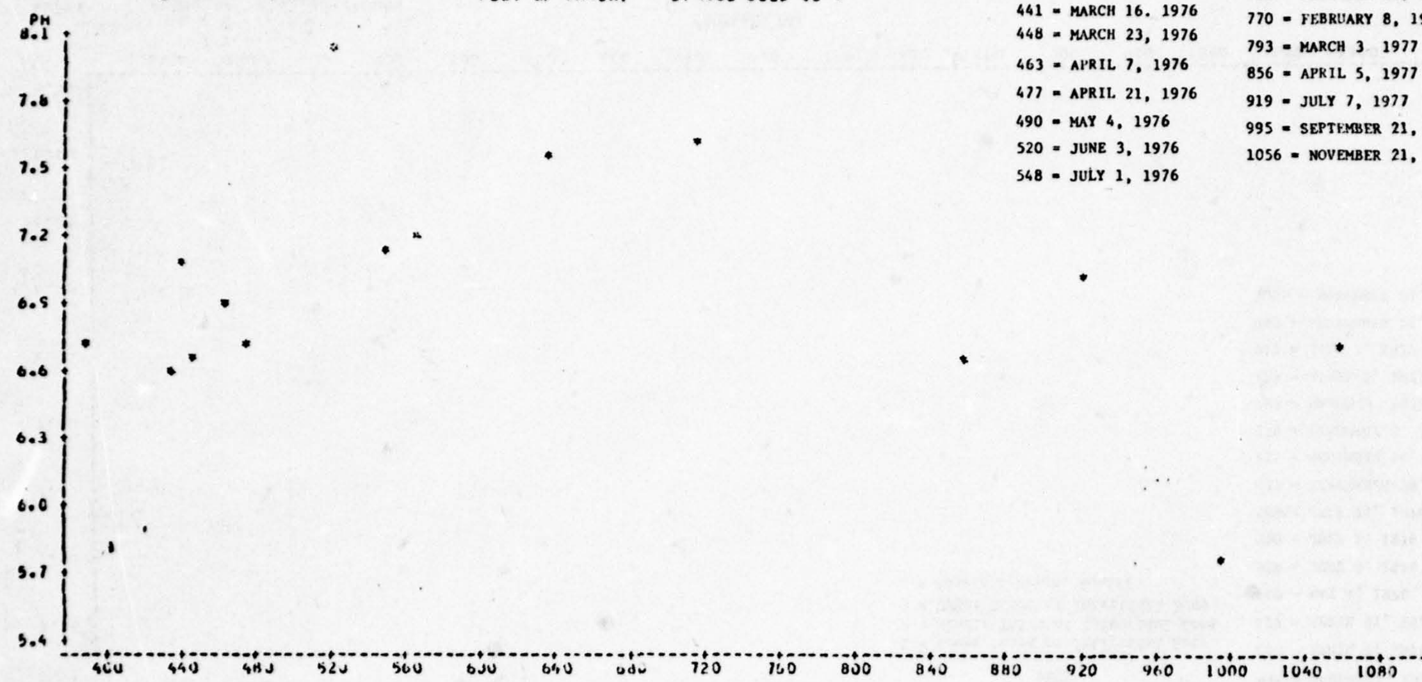
520 = JUNE 3, 1976
548 = JULY 1, 1976
568 = JULY 21, 1976
637 = SEPTEMBER 28, 1976
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

NOTE: 2 OBS HAD MISSING VALUES

PH OF BUTTERMILK SOUND INTERSTITIAL WATER
ZONE=3
PLOT OF PH*DAY SYMBOL USED IS *



ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone
. = Adjacent Marsh, Runoff

SAMPLING DAY

390 = JANUARY 25, 1976
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441 = MARCH 16, 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
490 = MAY 4, 1976
520 = JUNE 3, 1976
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568 = JULY 21, 1976
637 = SEPTEMBER 28, 1976
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

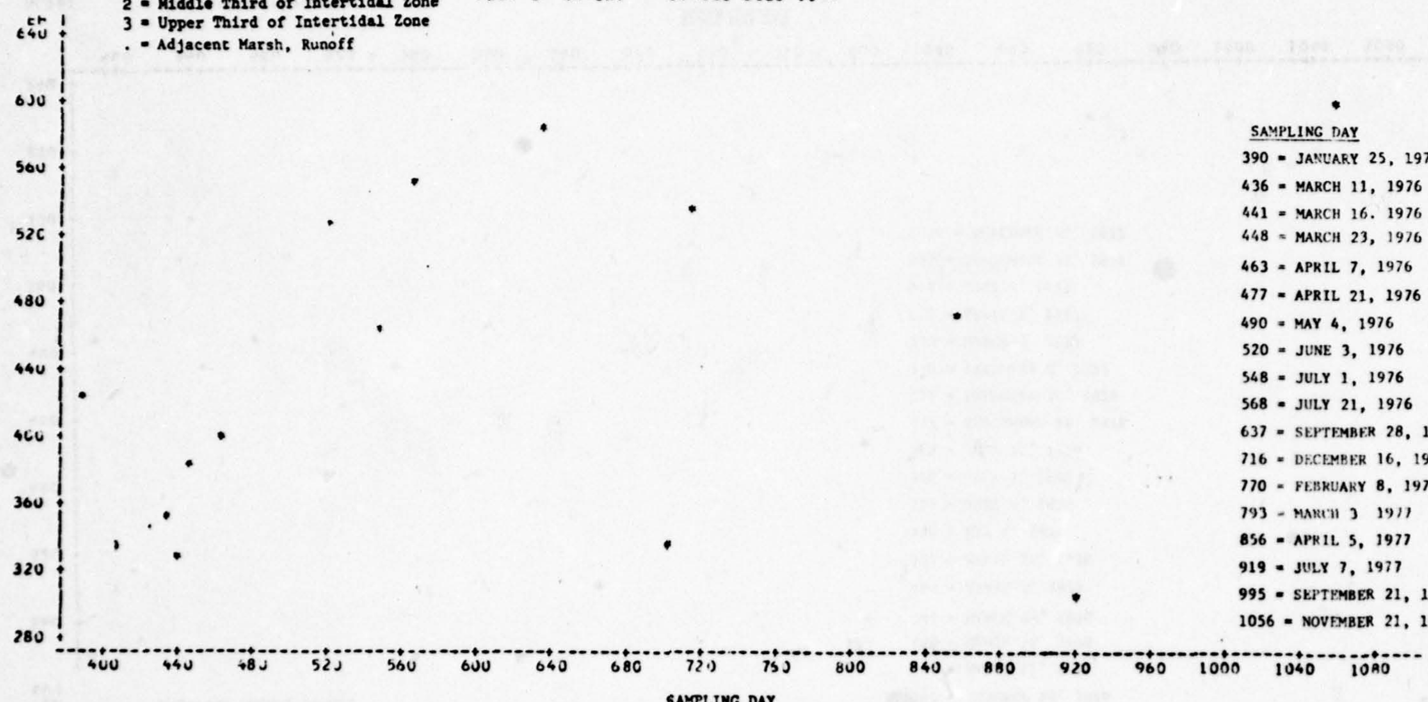
NOTE: 2 OBS HAD MISSING VALUES

EH OF BUTTERMILK SOUND INTERSTITIAL WATER ZONE=. 21:09 SATURDAY, MARCH 4, 1978 11

PLOT OF EH*DAY SYMBOL USED IS *

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone
. = Adjacent Marsh, Runoff



SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16. 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
490 = MAY 4, 1976
520 = JUNE 3, 1976
548 = JULY 1, 1976
568 = JULY 21, 1976
637 = SEPTEMBER 28, 1976
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

NOTE: 4 OBS HAD MISSING VALUES

EH OF BUTTERMILK SOUND INTERSTITIAL WATER
ZONE=1

PLOT OF EH*DAY SYMBOL USED IS *

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone
. = Adjacent Marsh, Runoff

SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16. 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
490 = MAY 4, 1976
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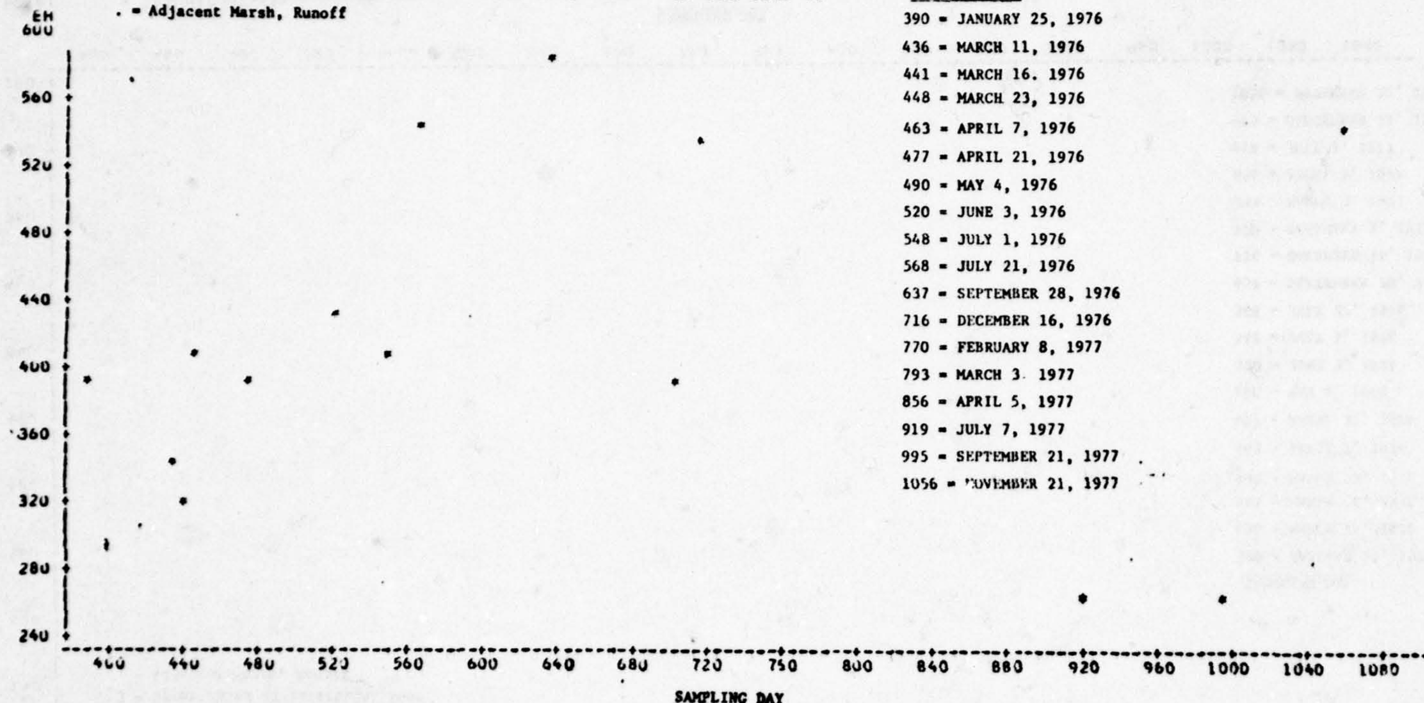
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977



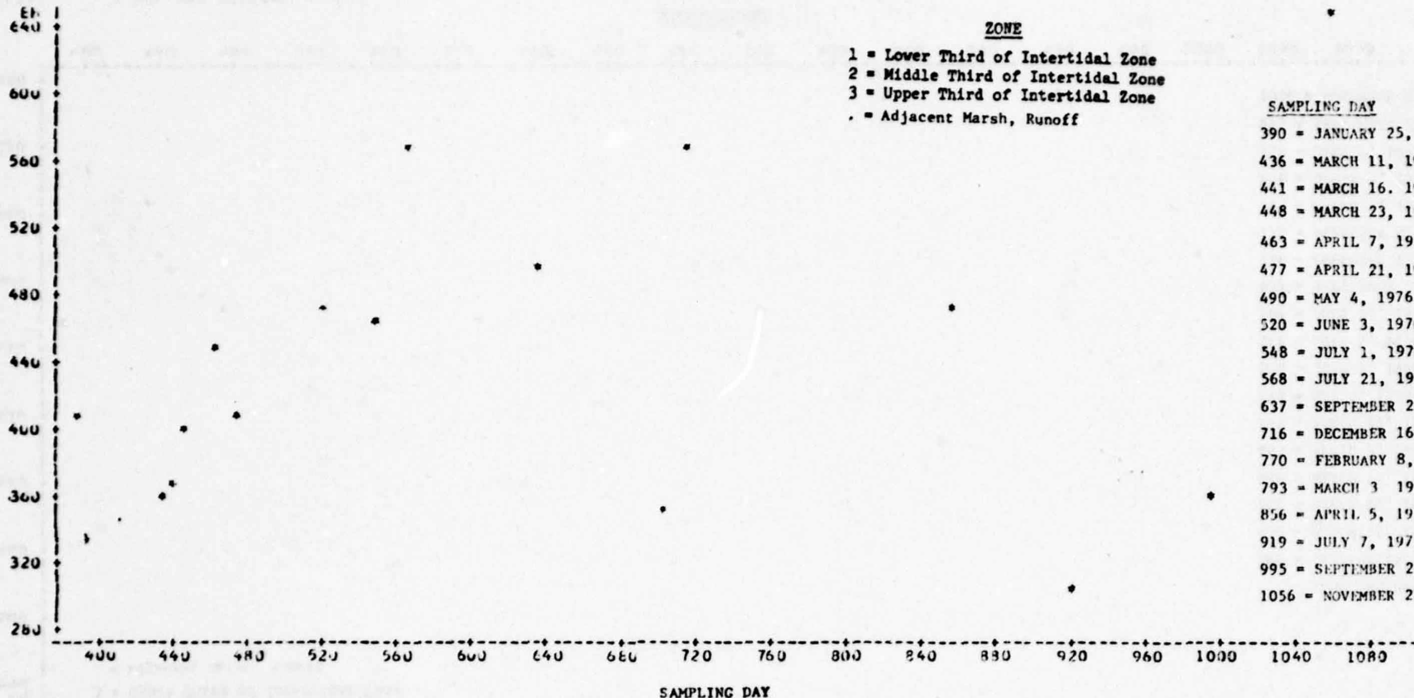
NOTE: 2 OBS HAD MISSING VALUES

B272

11

EH OF BUTTERMILK SOUND INTERSTITIAL WATER ZONE=2 21:09 SATURDAY, MARCH 4, 1978 13

PLOT OF EH*DAY SYMBOL USED IS *



ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone
. = Adjacent Marsh, Runoff

SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16. 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
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520 = JUNE 3, 1976
548 = JULY 1, 1976
568 = JULY 21, 1976
637 = SEPTEMBER 28, 1976
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

NOTE: 2 OBS HAD MISSING VALUES

B273

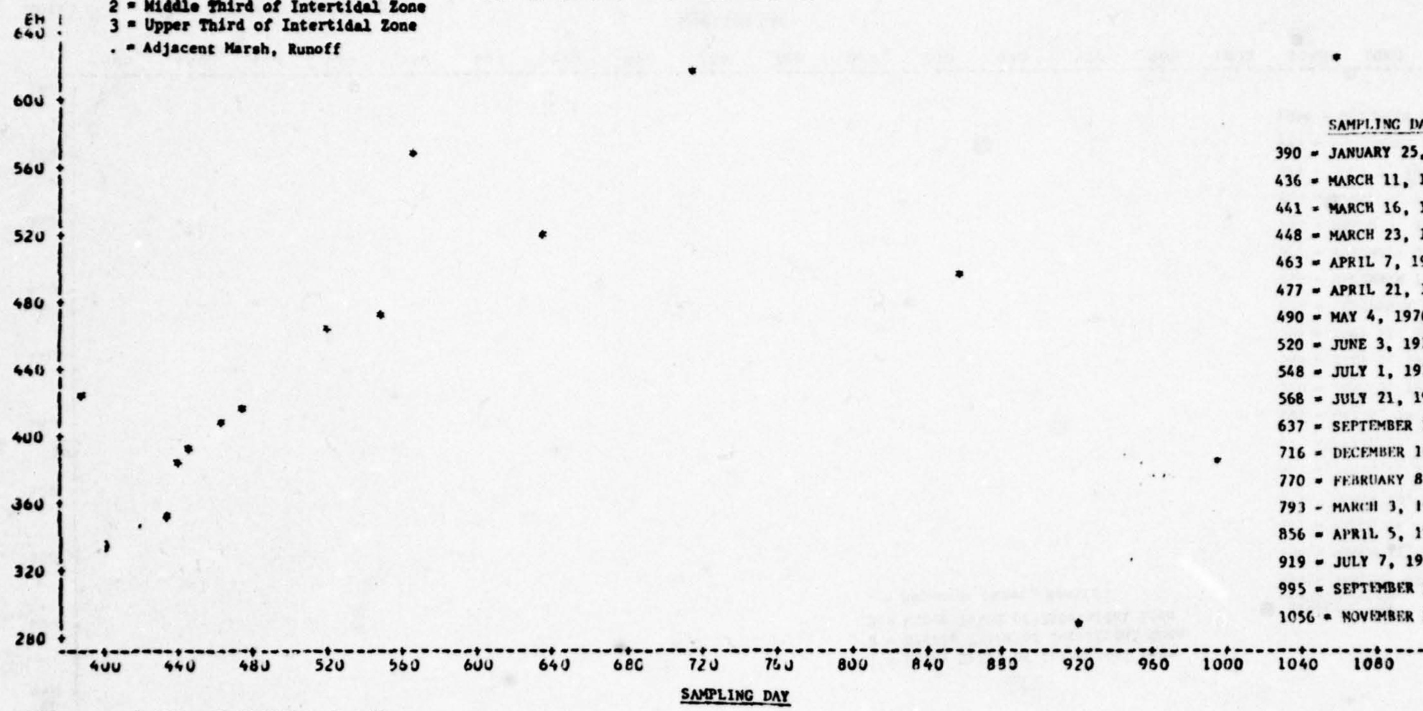
EH OF BUTTERMILK SOUND INTERSTITIAL WATER 21:09 SATURDAY, MARCH 4, 1978 14

ZONE=3

PLOT OF EH*DAY SYMBOL USED IS *

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone
. = Adjacent Marsh, Runoff



SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16, 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
490 = MAY 4, 1976
520 = JUNE 3, 1976
548 = JULY 1, 1976
568 = JULY 21, 1976
637 = SEPTEMBER 28, 1976
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3, 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

NOTE: 2 OBS HAD MISSING VALUES

B274

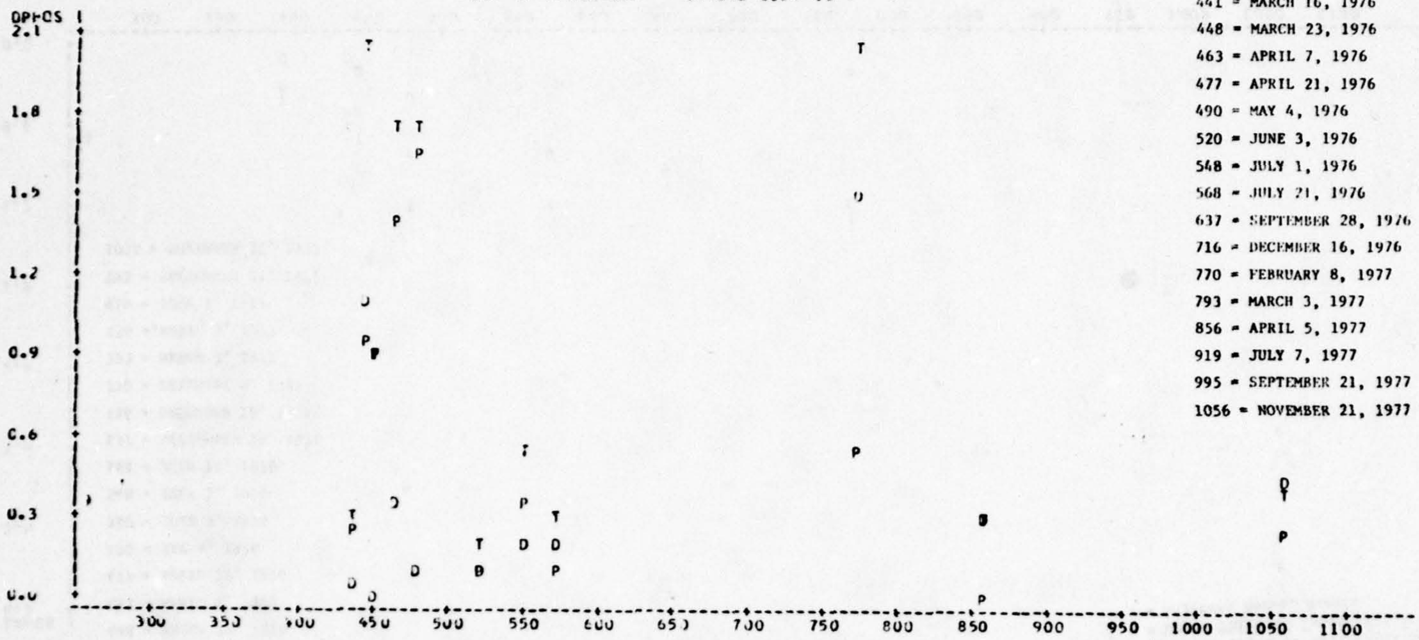
ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone
. = Adjacent Marsh, Runoff

FRACTIONS OF TOTAL PHOSPHORUS IN BUTTERMILK SOUND INTERSTITIAL WATER 21:09

ZONE=.

PLOT OF OPHOS*DAY SYMBOL USED IS D
PLOT OF FPHOS*DAY SYMBOL USED IS P
PLOT OF TPHOS*DAY SYMBOL USED IS T



SAMPLING DAY

NOTE: 2 OBS HAD MISSING VALUES

SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16, 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
490 = MAY 4, 1976
520 = JUNE 3, 1976
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637 = SEPTEMBER 28, 1976
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3, 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

FRACTIONS OF TOTAL PHOSPHORUS IN BUTTERMILK SOUND INTERSTITIAL WATER

ZONE=1

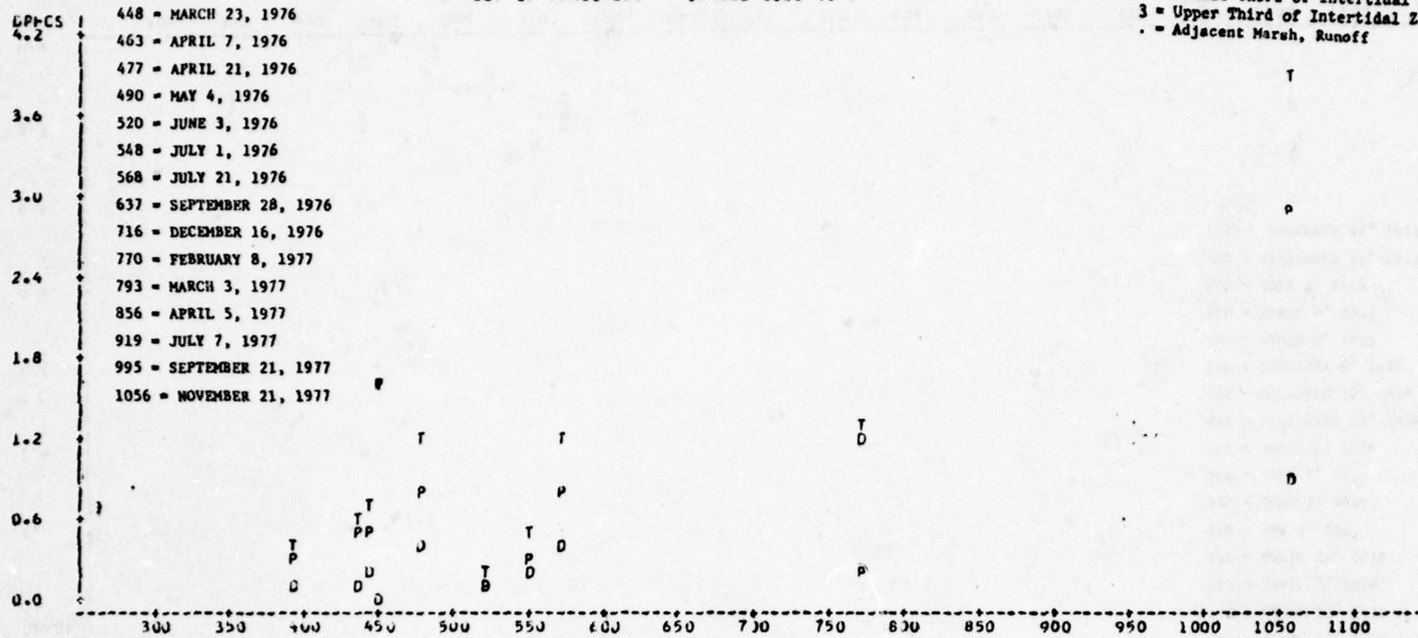
PLOT OF DPHOS*DAY SYMBOL USED IS D
PLOT OF PPHOS*DAY SYMBOL USED IS P
PLOT OF TPHOS*DAY SYMBOL USED IS T

SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16, 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
490 = MAY 4, 1976
520 = JUNE 3, 1976
548 = JULY 1, 1976
568 = JULY 21, 1976
637 = SEPTEMBER 28, 1976
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3, 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone
. = Adjacent Marsh, Runoff



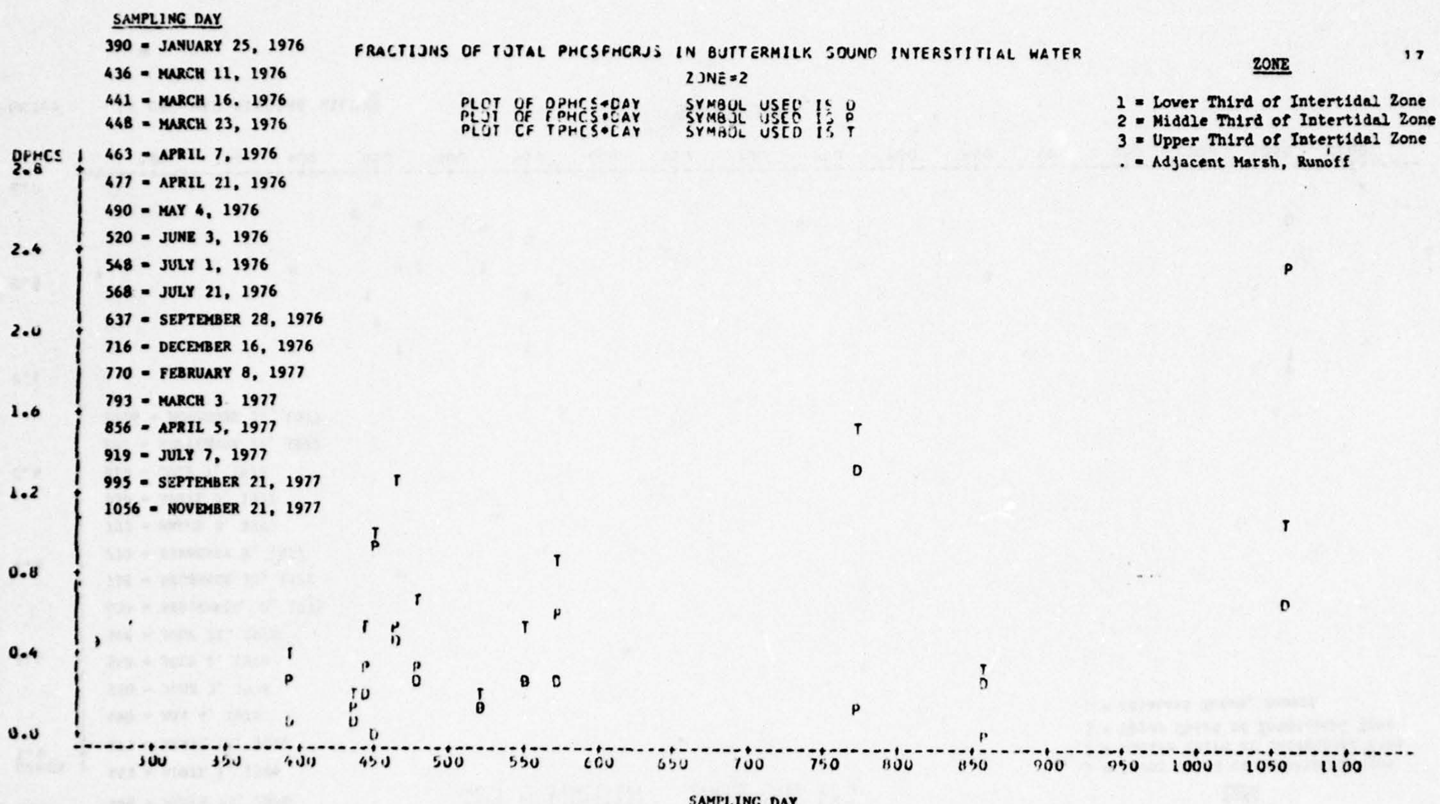
NOTE: 18 OBS HAD MISSING VALUES

B276

FRACTIONS OF TOTAL PHOSPHORUS IN BUTTERMILK SOUND INTERSTITIAL WATER 17

ZONE=2

PLOT OF DPHOS*DAY SYMBOL USED IS D
PLOT OF PPHOS*DAY SYMBOL USED IS P
PLOT OF TPHOS*DAY SYMBOL USED IS T



NOTE: 18 OBS HAD MISSING VALUES

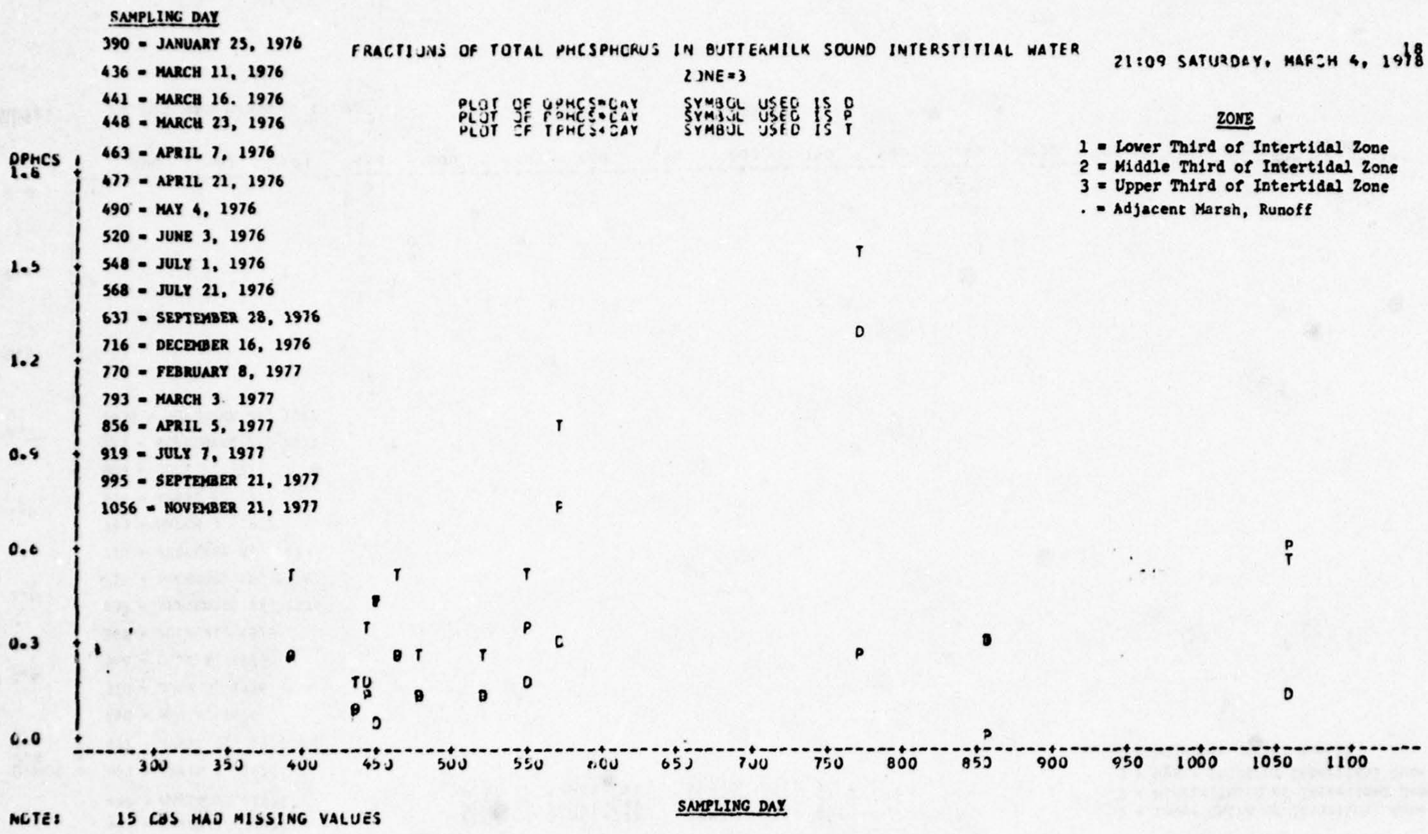
B277

FRACTIONS OF TOTAL PHOSPHORUS IN BUTTERMILK SOUND INTERSTITIAL WATER

21:09 SATURDAY, MARCH 4, 1978 18

ZONE=3

PLOT OF OPHCS*DAY SYMBOL USED IS D
PLOT OF FPHCS*DAY SYMBOL USED IS P
PLOT OF TPHCS*DAY SYMBOL USED IS T



NOTE: 15 OBS HAD MISSING VALUES

B278

MEAN CONCENTRATION OF AMMONIA AND ORTHO PHOSPHATE IN INTERSTITIAL WATER 21:09 SATURDAY, MARCH 4, 1978 3

ZONE=.

PLOT OF AMMO*DAY SYMBOL USED IS *
PLOT OF OPHOS*DAY SYMBOL USED IS 0

SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16. 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
490 = MAY 4, 1976
520 = JUNE 3, 1976
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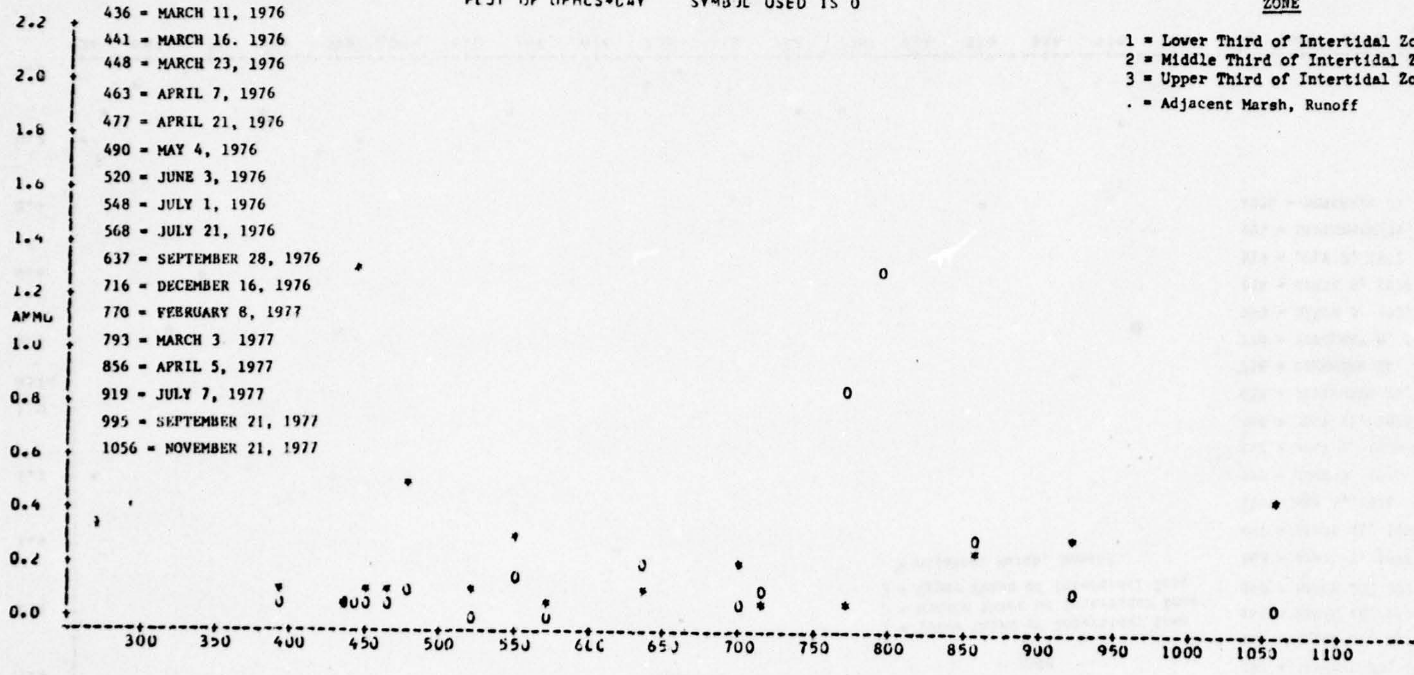
770 = FEBRUARY 8, 1977
793 = MARCH 3 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone
. = Adjacent Marsh, Runoff



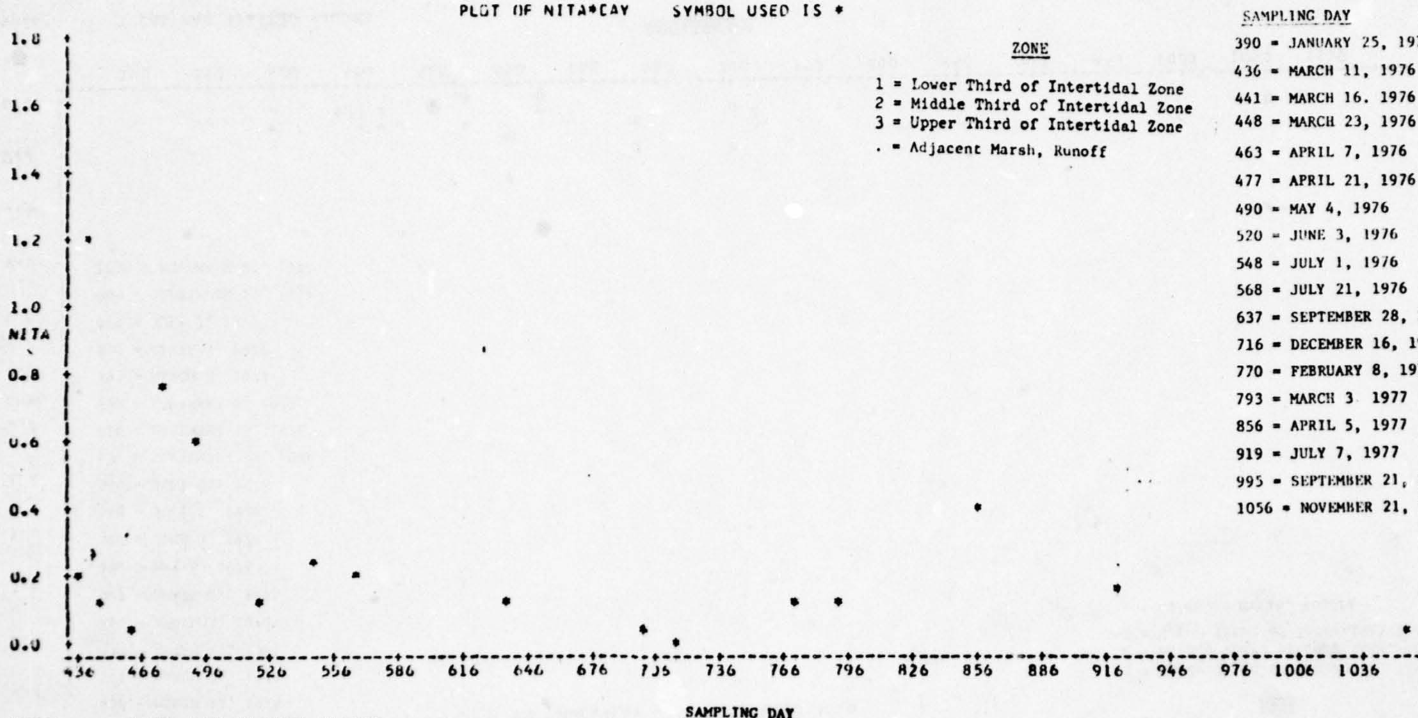
NOTE: 3 OBS HAD MISSING VALUES

B279

NITRATE AND NITRITE OF INTERSTITIAL WATER SAMPLES FROM BUTTERMILK SOUND   20:32 SATURDAY, MARCH 4, 1978   3

ZONE=.

PLOT OF NITA*DAY   SYMBOL USED IS *



ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone
. = Adjacent Marsh, Runoff

SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16. 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
490 = MAY 4, 1976
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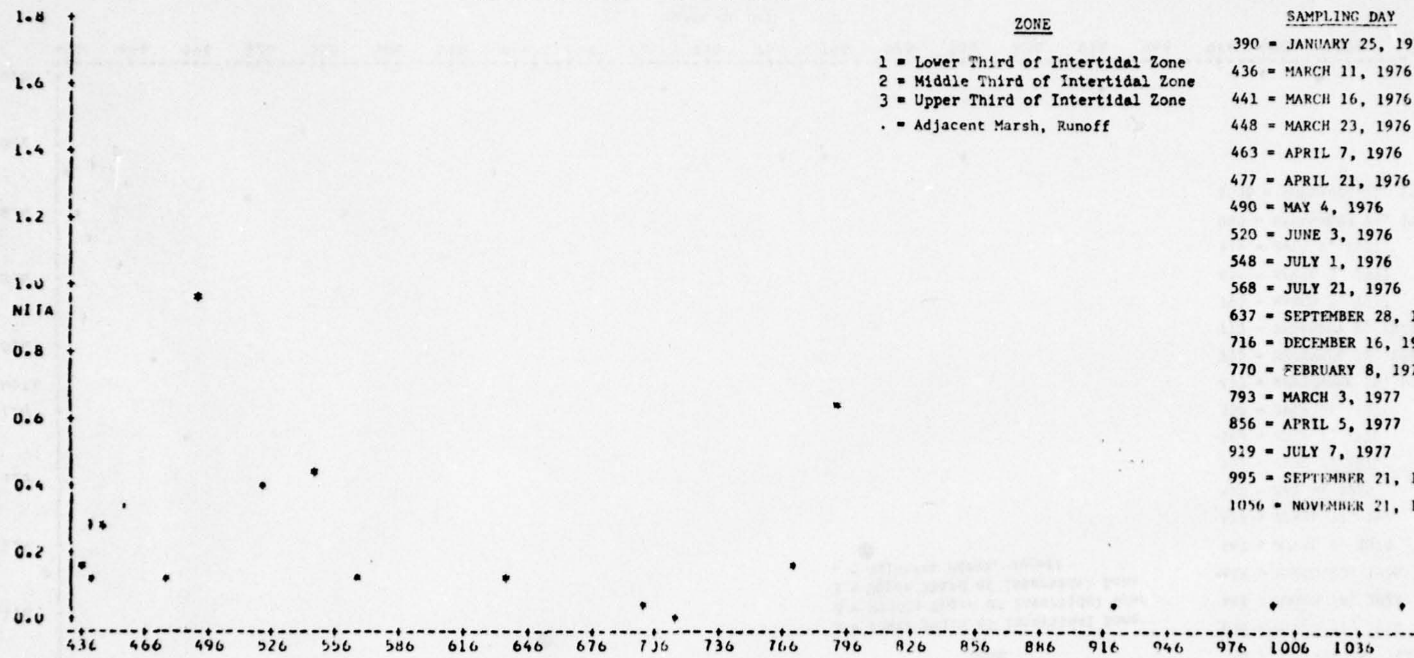
568 = JULY 21, 1976
637 = SEPTEMBER 28, 1976
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

NOTE: 1 OBS HAD MISSING VALUES

NITRATE AND NITRITE OF INTERSTITIAL WATER SAMPLES FROM BUTTERMILK SOUND 20:32 SATURDAY, MARCH 4, 1978 4

ZONE=1

PLOT OF NITA*DAY SYMBOL USED IS *



ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone
. = Adjacent Marsh, Runoff

SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16, 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
490 = MAY 4, 1976
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548 = JULY 1, 1976
568 = JULY 21, 1976
637 = SEPTEMBER 28, 1976
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3, 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

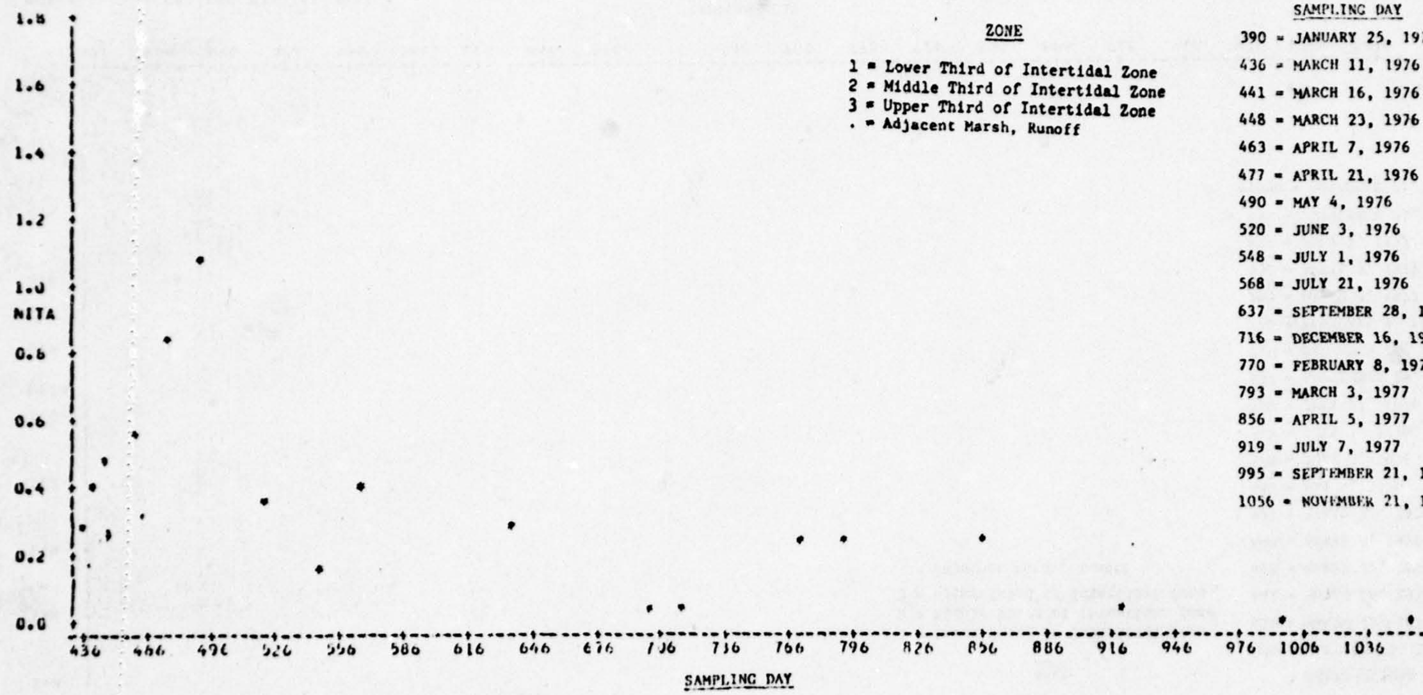
NOTE: 1 OBS HAD MISSING VALUES

B281

NITRATE AND NITRITE OF INTERSTITIAL WATER SAMPLES FROM BUTTERMILK SOUND 20:32 SATURDAY, MARCH 4, 1978

ZONE=2

PLOT OF NITA*DAY SYMBOL USED IS *



ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone
. = Adjacent Marsh, Runoff

SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16, 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
490 = MAY 4, 1976
520 = JUNE 3, 1976
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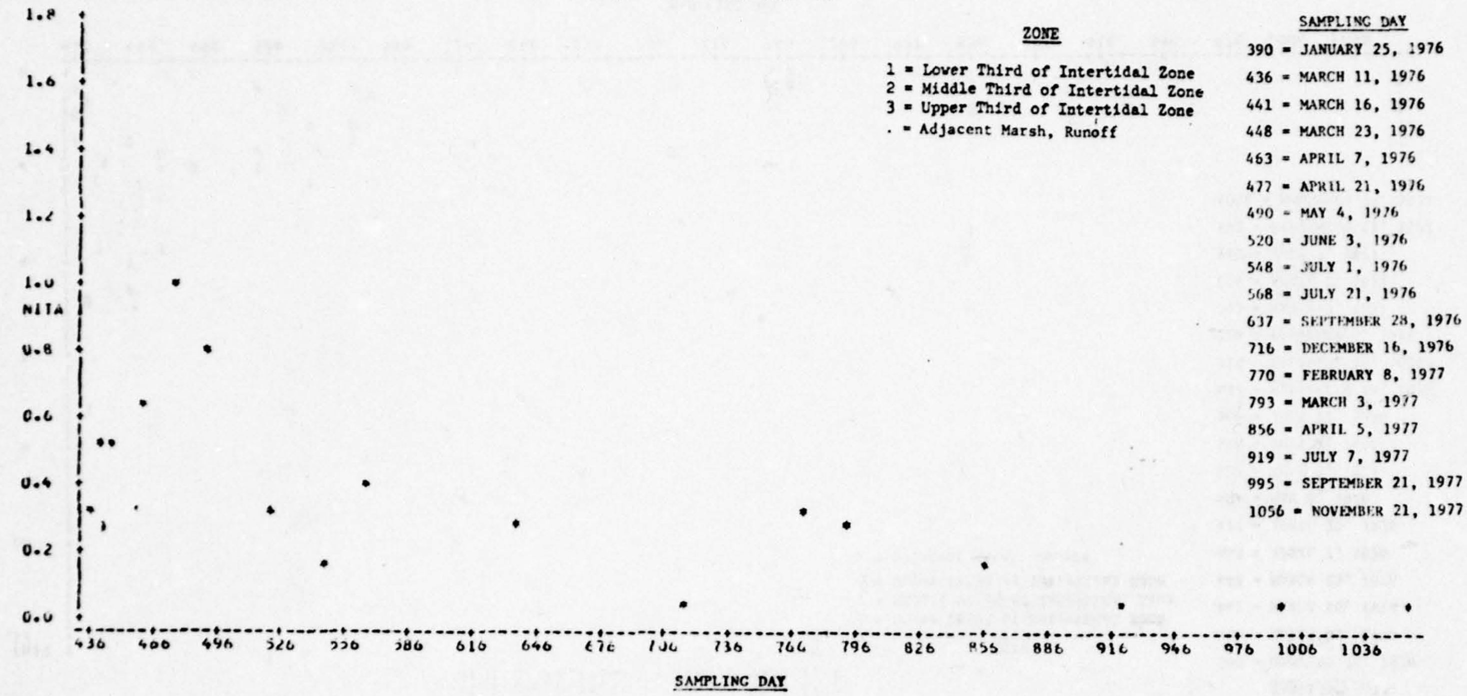
568 = JULY 21, 1976
637 = SEPTEMBER 28, 1976
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3, 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

B282

NITRATE AND NITRITE OF INTERSTITIAL WATER SAMPLES FROM BUTTERMILK SOUND   20:32 SATURDAY, MARCH 4, 1978

ZONE=3

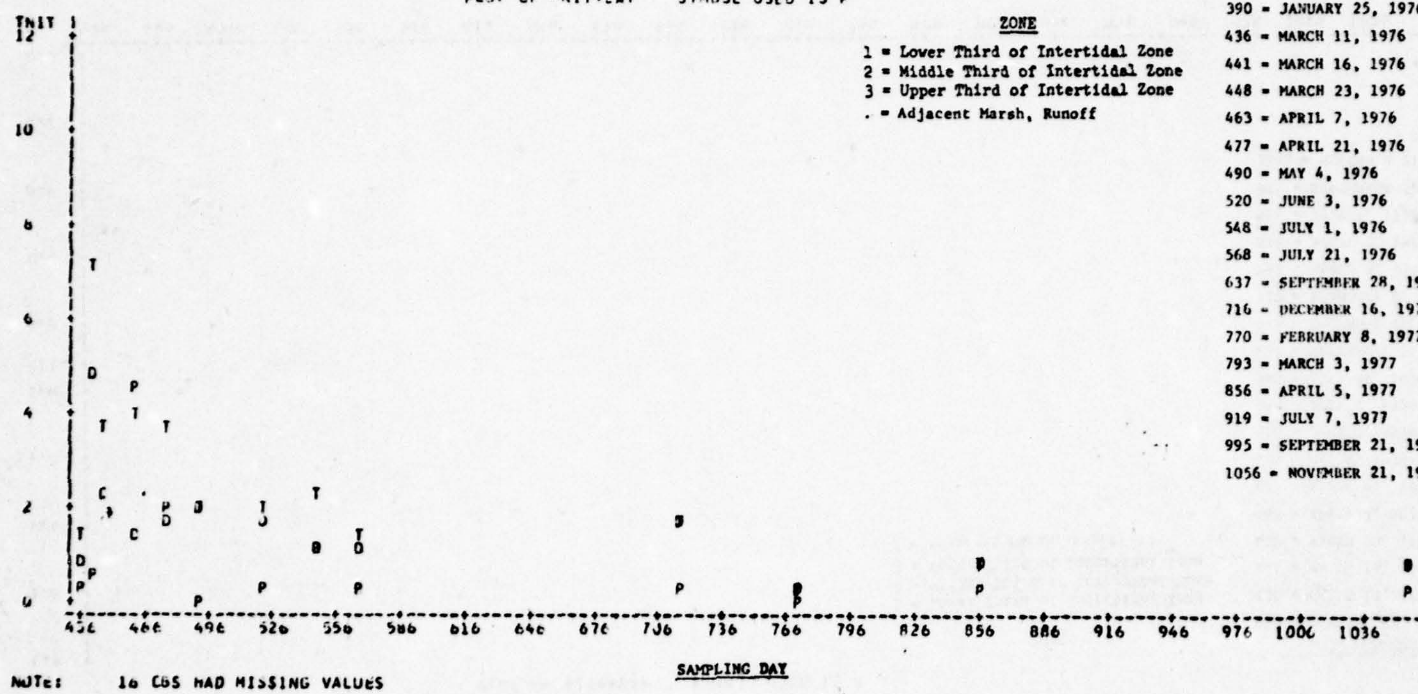
PLOT OF NITA*DAY   SYMBOL USED IS *



FRACTION OF TOTAL NITROGEN IN BUTTERMILK SOUND INTERSTITIAL WATER 20:32 SATURDAY, MARCH 4, 1978 7

ZONE=.

PLOT OF TNIT*DAY SYMBOL USED IS T
PLOT OF DNIT*DAY SYMBOL USED IS D
PLOT OF PNIT*DAY SYMBOL USED IS P



ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone
. = Adjacent Marsh, Runoff

SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16, 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
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520 = JUNE 3, 1976
548 = JULY 1, 1976
568 = JULY 21, 1976
637 = SEPTEMBER 28, 1976
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3, 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

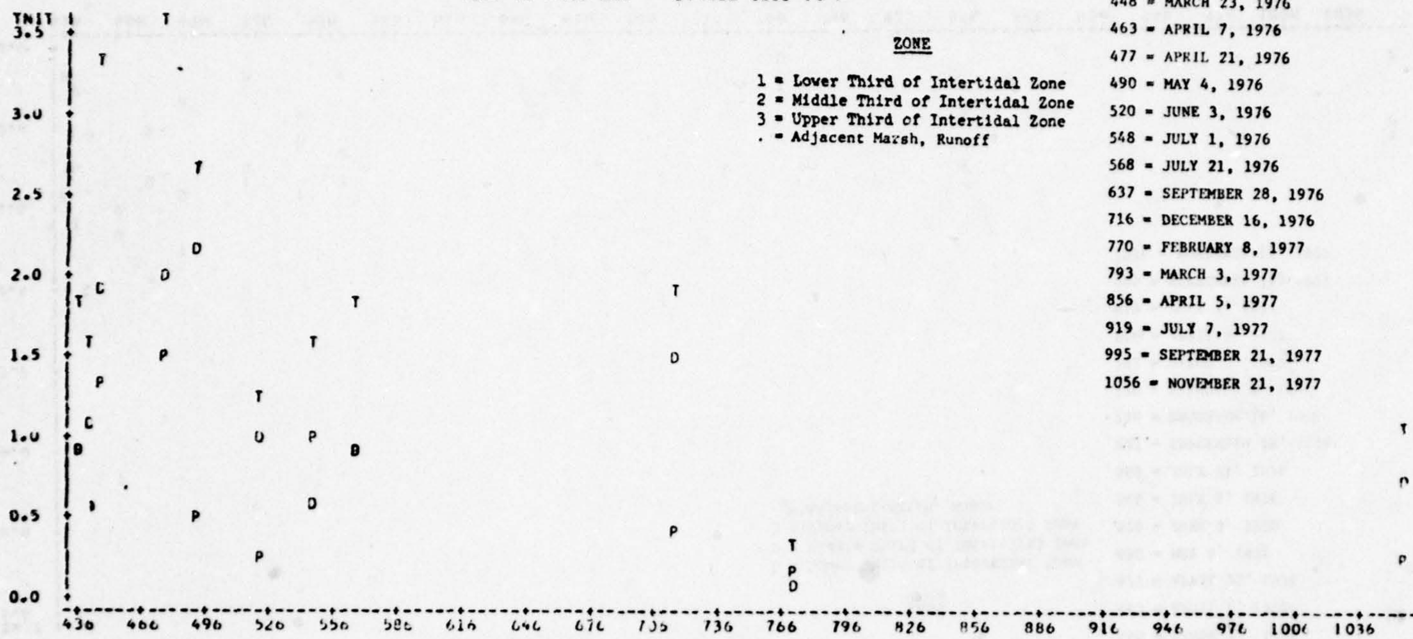
NOTE: 16 OBS HAD MISSING VALUES

B284

FRACTION OF TOTAL NITROGEN IN BUTTERMILK SOUND INTERSTITIAL WATER

ZONE=1

PLOT OF TNIT*DAY SYMBOL USED IS T
PLOT OF DNIT*DAY SYMBOL USED IS D
PLOT OF PNIT*DAY SYMBOL USED IS P



ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone
. = Adjacent Marsh, Runoff

SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16, 1976
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463 = APRIL 7, 1976
477 = APRIL 21, 1976
490 = MAY 4, 1976
520 = JUNE 3, 1976
548 = JULY 1, 1976
568 = JULY 21, 1976
637 = SEPTEMBER 28, 1976
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3, 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

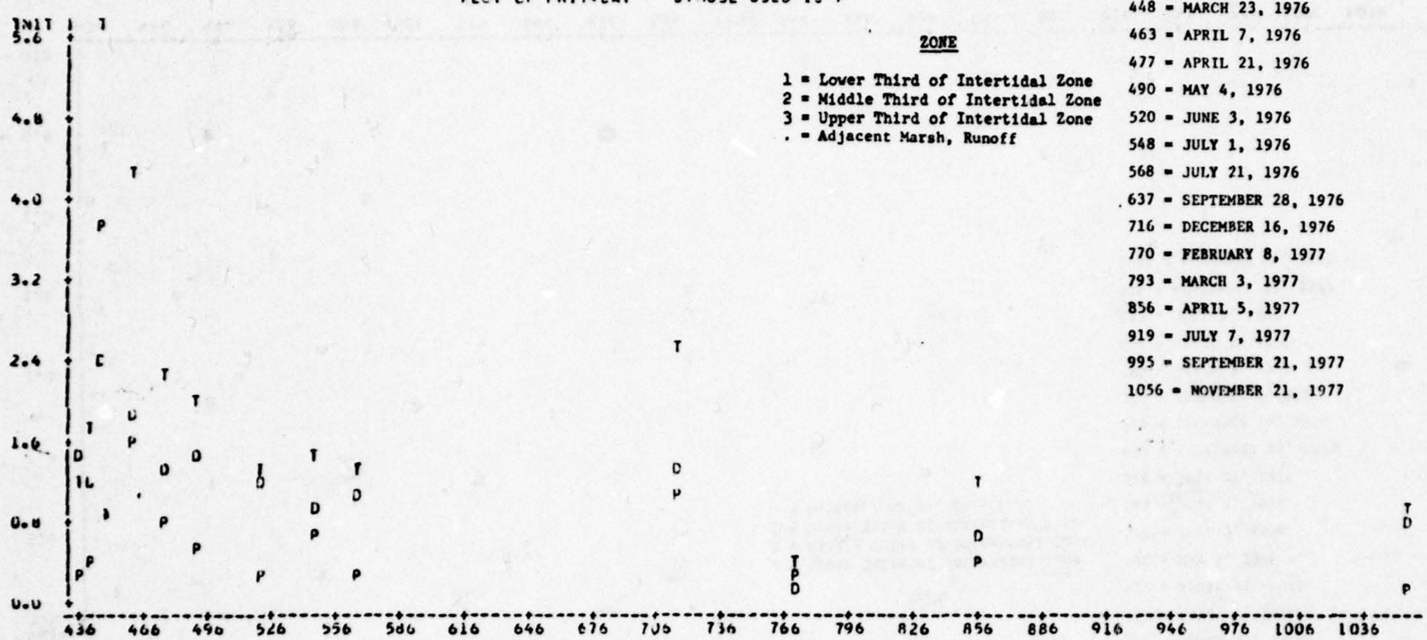
, 1978

NOTE: 19 OBS HAD MISSING VALUES

FRACTION OF TOTAL NITROGEN IN BUTTERMILK SOUND INTERSTITIAL WATER

ZONE=2

PLOT OF TNIT*DAY   SYMBOL USED IS T
PLOT OF DNIT*DAY   SYMBOL USED IS D
PLOT OF PNIT*DAY   SYMBOL USED IS P



ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone
. = Adjacent Marsh, Runoff

SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16, 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
490 = MAY 4, 1976
520 = JUNE 3, 1976
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637 = SEPTEMBER 28, 1976
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3, 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

NOTE: 15 OBS HAD MISSING VALUES

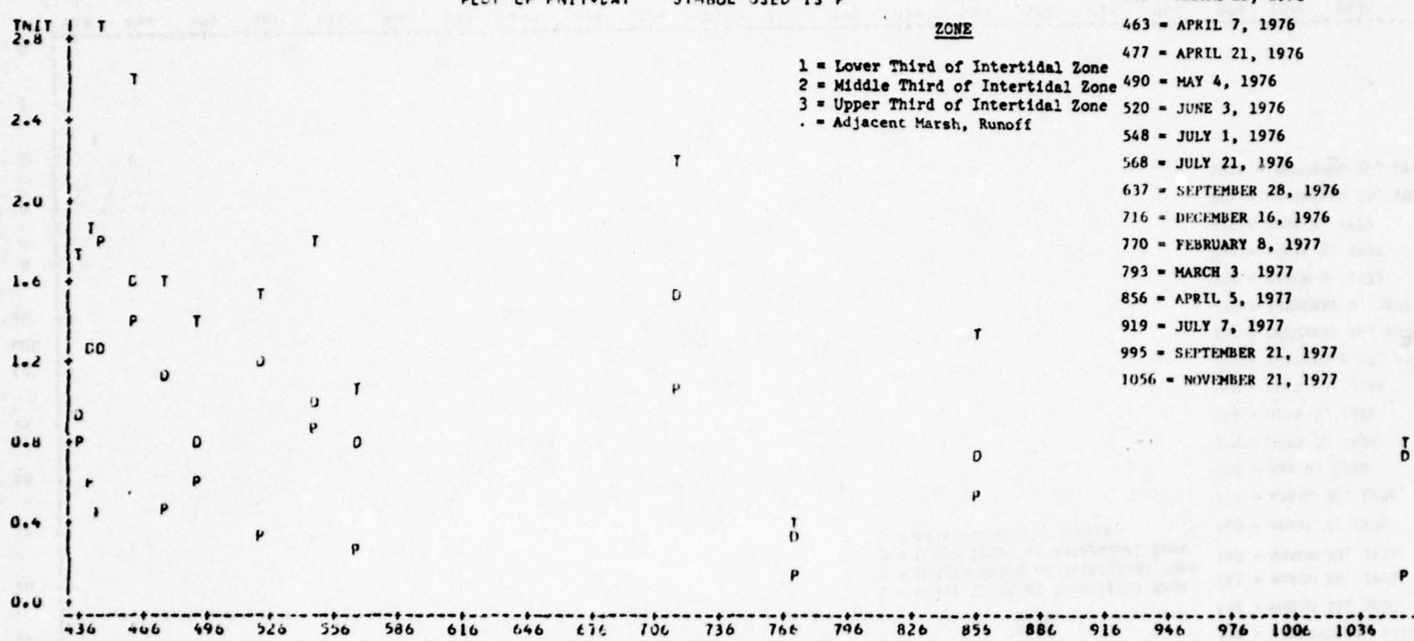
1978

B286

FRACTION OF TOTAL NITROGEN IN BUTTERMILK SOUND INTERSTITIAL WATER

ZONE=3

PLOT OF TNIT*DAY SYMBOL USED IS T
PLOT OF DNIT*DAY SYMBOL USED IS D
PLOT OF PNIT*DAY SYMBOL USED IS P



NOTE: 12 OBS HAD MISSING VALUES

SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16, 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
490 = MAY 4, 1976
520 = JUNE 3, 1976
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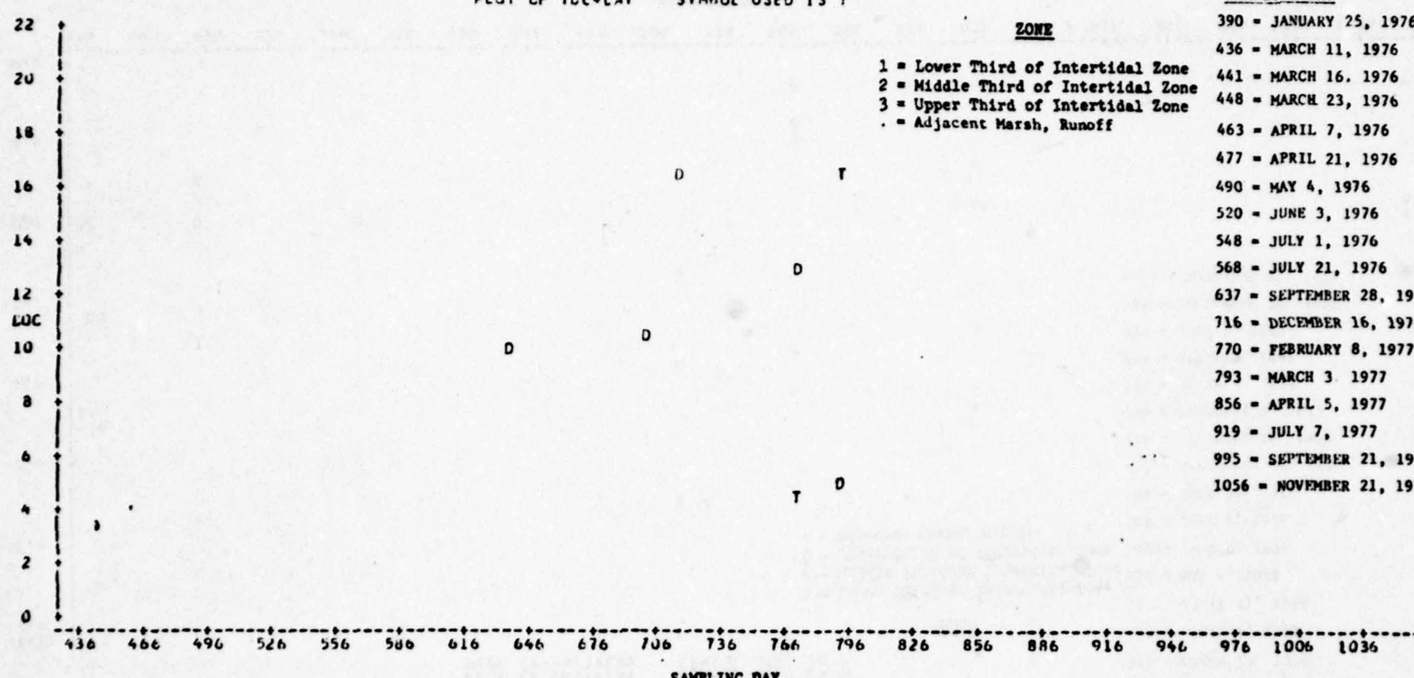
637 = SEPTEMBER 28, 1976
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

10
1978

TOTAL AND DISSOLVED ORGANIC CARBON FROM BUTTERMILK SOUND INTERSTITIAL WATER 20:32 SATURDAY, MARCH 4, 1978 11

ZONE=.

PLOT OF DOC*DAY SYMBOL USED IS D
PLOT OF TOC*DAY SYMBOL USED IS T



ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone
. = Adjacent Marsh, Runoff

SAMPLING DAY

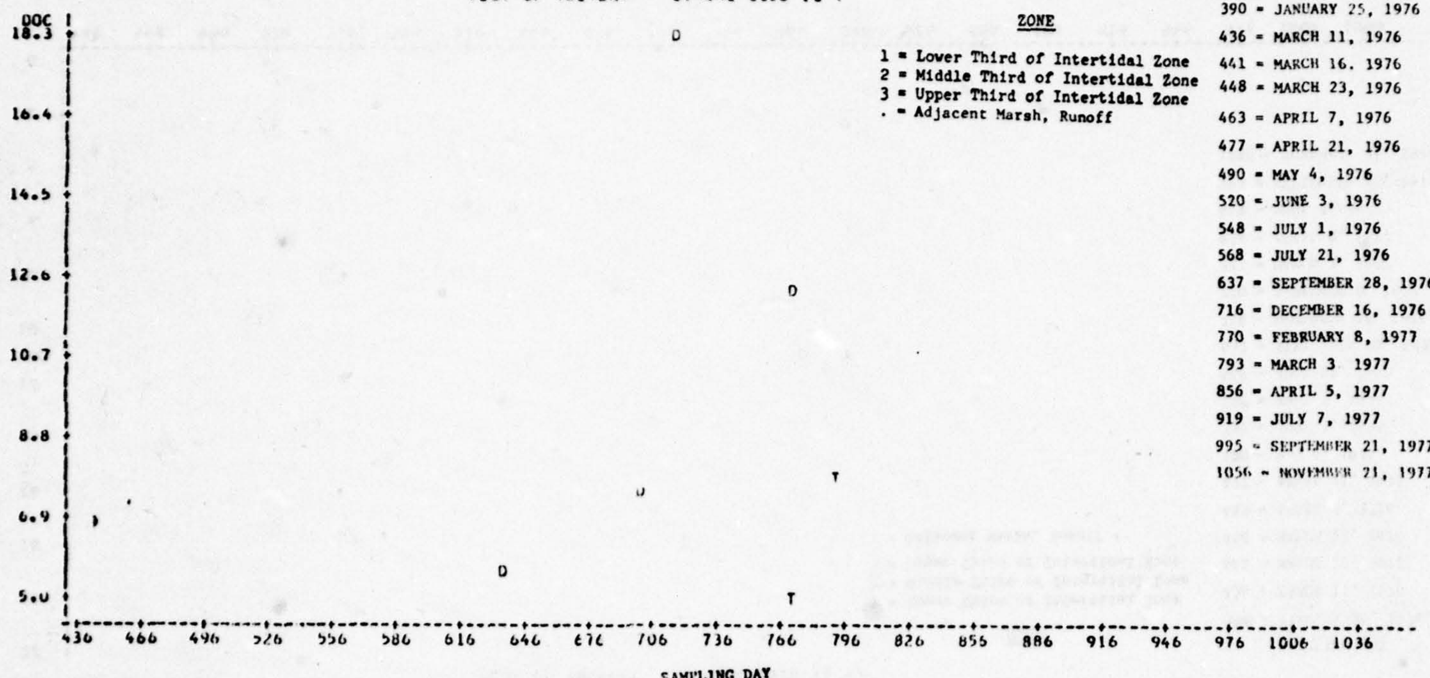
390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16, 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
490 = MAY 4, 1976
520 = JUNE 3, 1976
548 = JULY 1, 1976
568 = JULY 21, 1976
637 = SEPTEMBER 28, 1976
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

NOTE: 29 OBS HAD MISSING VALUES

TOTAL AND DISSOLVED ORGANIC CARBON FROM BUTTERMILK SOUND INTERSTITIAL WATER 20:37 SATURDAY, MARCH 4, 1978

ZONE=1

PLOT OF DOC*DAY SYMBOL USED IS D
PLOT OF TOC*DAY SYMBOL USED IS T



ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone
. = Adjacent Marsh, Runoff

SAMPLING DAY

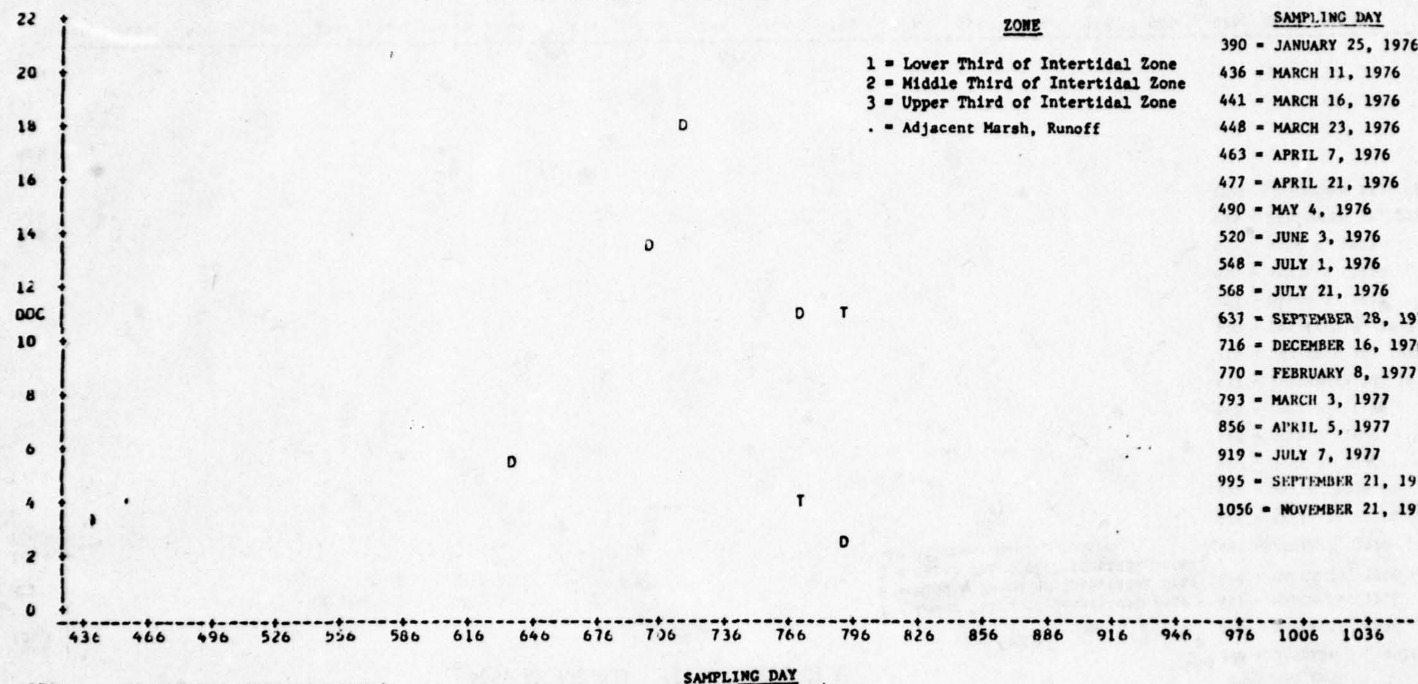
390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16, 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
490 = MAY 4, 1976
520 = JUNE 3, 1976
548 = JULY 1, 1976
568 = JULY 21, 1976
637 = SEPTEMBER 28, 1976
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

NOTE: 28 OBS HAD MISSING VALUES

TOTAL AND DISSOLVED ORGANIC CARBON FROM BUTTERMILK SOUND INTERSTITIAL WATER 20:32 SATURDAY, MARCH 4, 1978

ZONE=2

PLOT OF DOC*DAY SYMBOL USED IS D
PLOT OF TOC*DAY SYMBOL USED IS T



ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone
. = Adjacent Marsh, Runoff

SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16, 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
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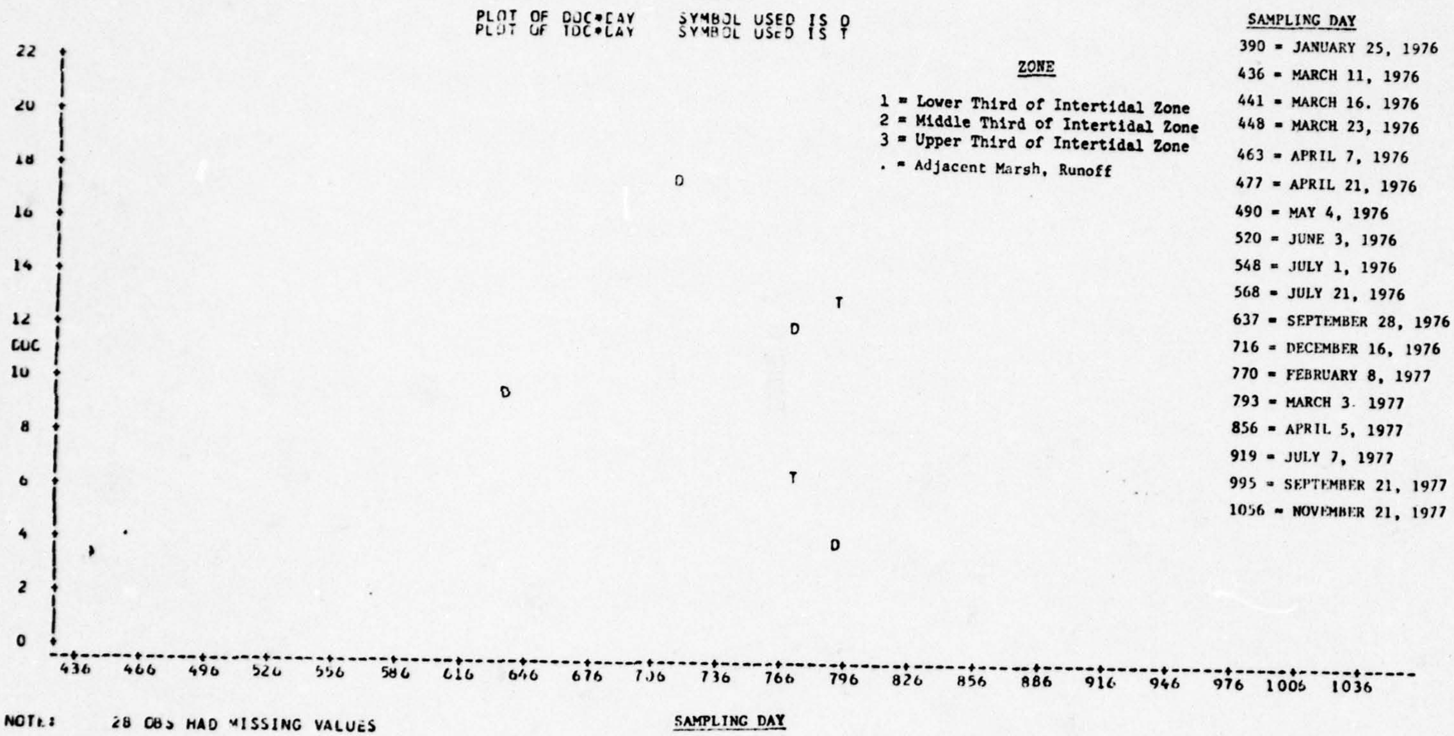
637 = SEPTEMBER 28, 1976
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3, 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

NOTE: 29 OBS HAD MISSING VALUES

TOTAL AND DISSOLVED ORGANIC CARBON FROM BUTTERMILK SOUND INTERSTITIAL WATER 20:32 SATURDAY, MARCH 4, 1978

ZONE=3



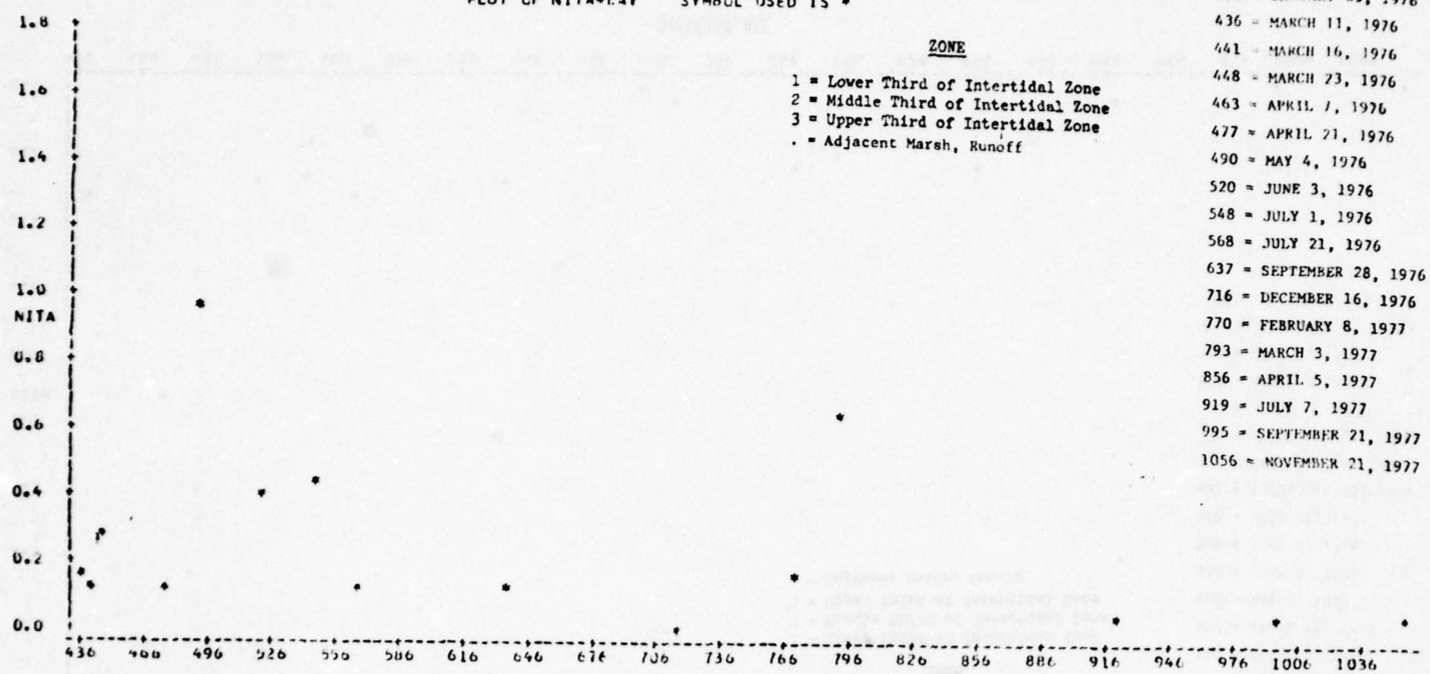
NOTE: 28 OBS HAD MISSING VALUES

PART 6

NITRATE AND NITRITE OF INTERSTITIAL WATER SAMPLES FROM BUTTERMILK SOUND 20:35

ZONE=1

PLOT OF NITA*DAY SYMBOL USED IS *



NOTE: 1 OBS HAD MISSING VALUES

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone
. = Adjacent Marsh, Runoff

SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16, 1976
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463 = APRIL 7, 1976
477 = APRIL 21, 1976
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548 = JULY 1, 1976
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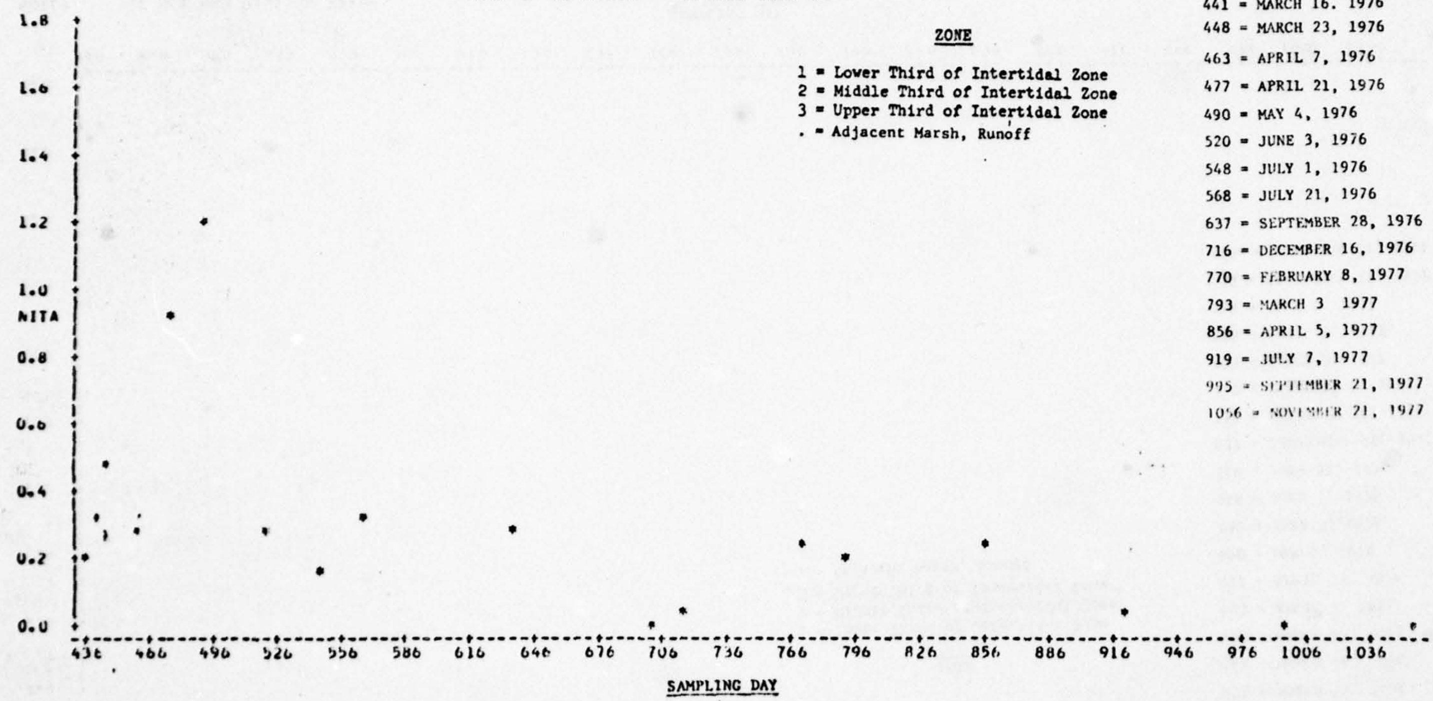
637 = SEPTEMBER 28, 1976
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3, 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

NITRATE AND NITRITE OF INTERSTITIAL WATER SAMPLES FROM BUTTERMILK SOUND 20:35

ZONE=2

PLOT OF NITA*DAY SYMBOL USED IS *



ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone
. = Adjacent Marsh, Runoff

SAMPLING DAY

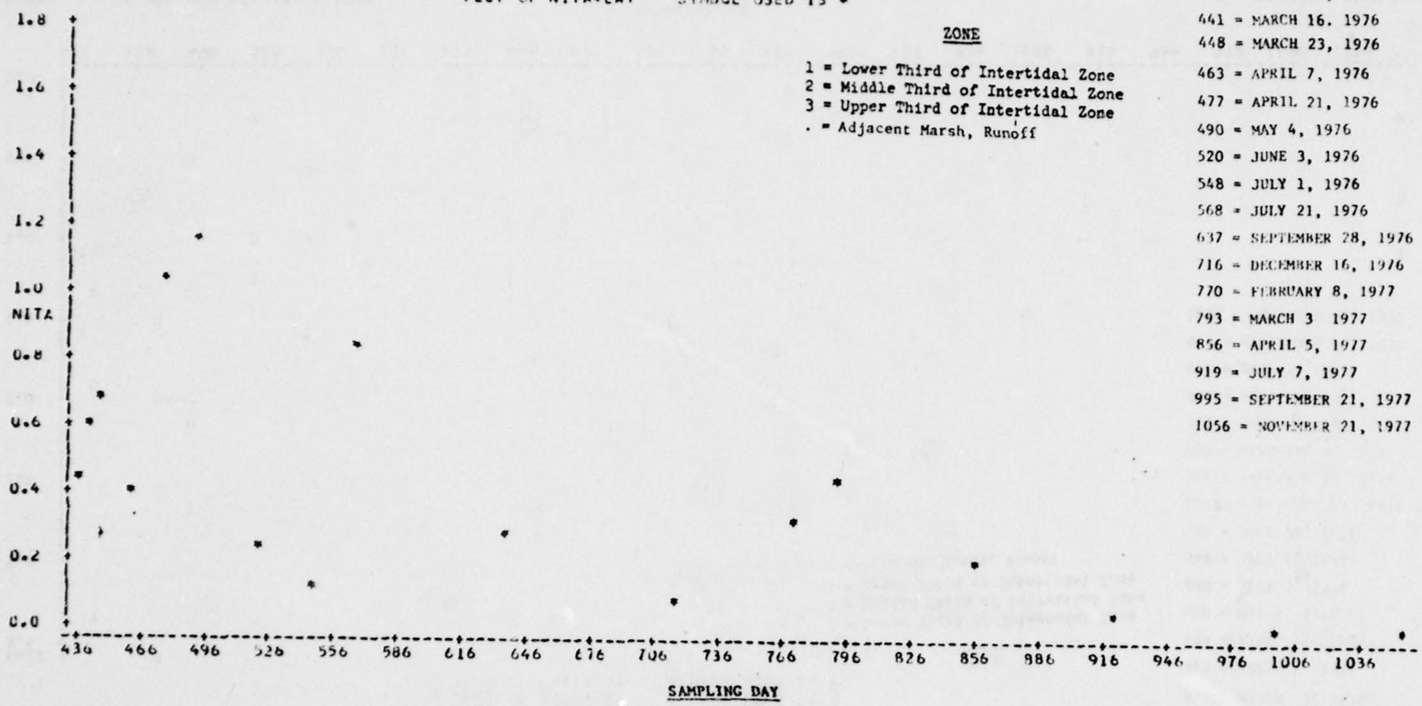
390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16. 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
490 = MAY 4, 1976
520 = JUNE 3, 1976
548 = JULY 1, 1976
568 = JULY 21, 1976
637 = SEPTEMBER 28, 1976
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

A294

NITRATE AND NITRITE OF INTERSTITIAL WATER SAMPLES FROM BUTTERMILK SOUND 20:35

ZONE=3

PLOT OF NITA*DAY SYMBOL USED IS *



ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone
. = Adjacent Marsh, Runoff

SAMPLING DAY

390 = JANUARY 25, 1976
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441 = MARCH 16. 1976
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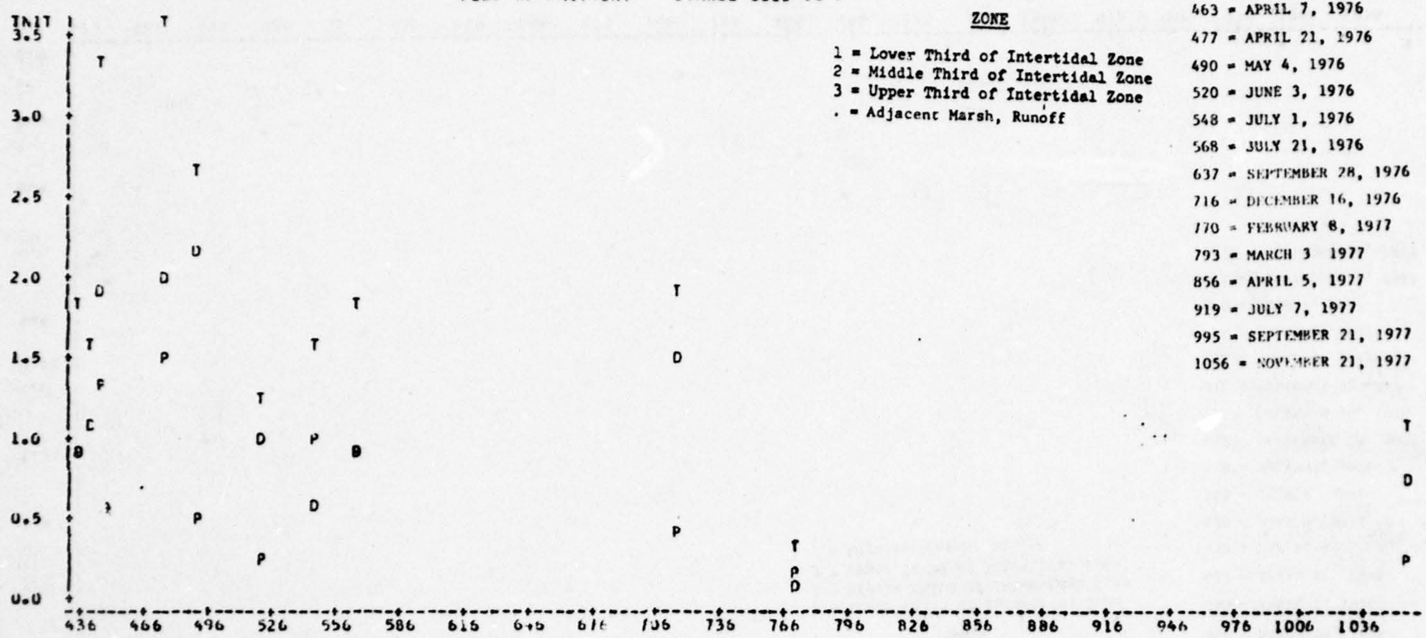
770 = FEBRUARY 8, 1977
793 = MARCH 3 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

FRACTION OF TOTAL NITROGEN IN BUTTERMILK SOUND INTERSTITIAL WATER 20:35

ZONE=1

PLOT OF TNIT*DAY SYMBOL USED IS T
PLOT OF DNIT*DAY SYMBOL USED IS D
PLOT OF PNIT*DAY SYMBOL USED IS P



ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone
. = Adjacent Marsh, Runoff

SAMPLING DAY

390 = JANUARY 25, 1976
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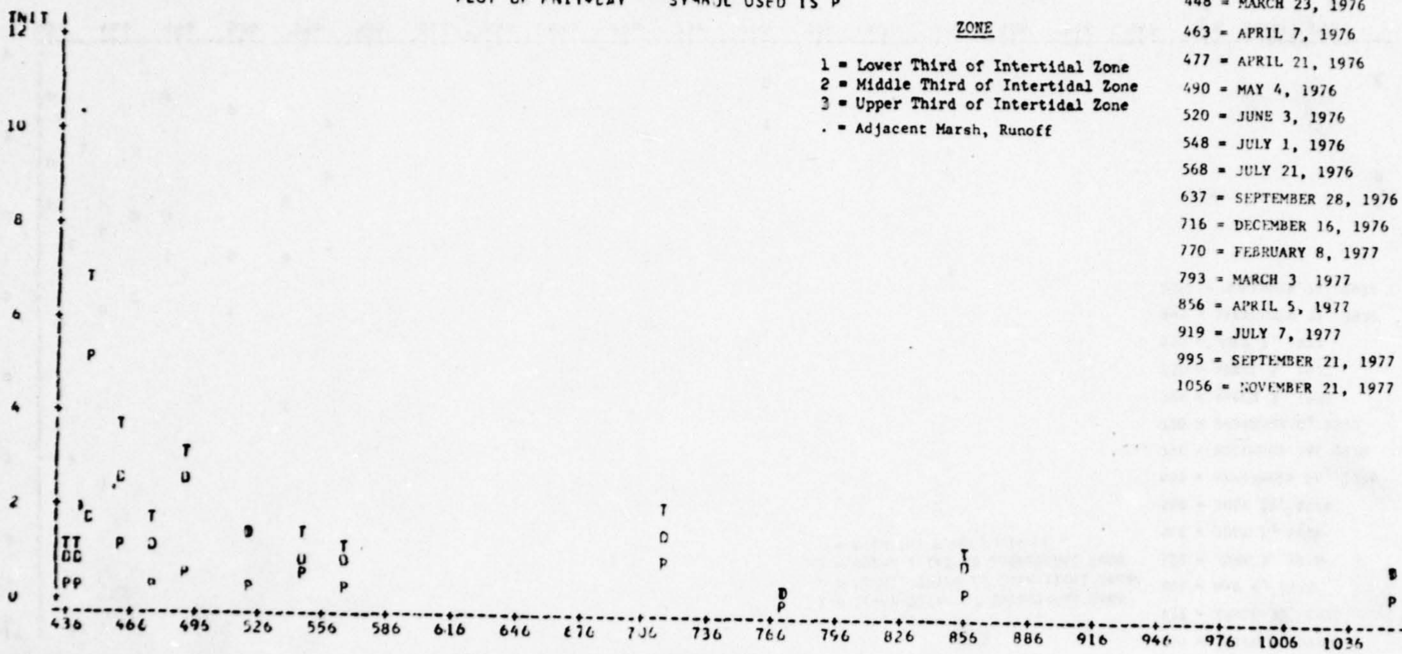
548 = JULY 1, 1976
568 = JULY 21, 1976
637 = SEPTEMBER 28, 1976
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

NOTE: 16 OBS HAD MISSING VALUES

FRACTION OF TOTAL NITRCGEN IN BUTTERMILK SOUND INTERSTITIAL WATER 20:35

ZONE=2

PLOT OF TNIT*DAY SYMBOL USED IS T
PLOT OF DNIT*DAY SYMBOL USED IS D
PLOT OF PNIT*DAY SYMBOL USED IS P



NOTE: 15 CBS HAD MISSING VALUES

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone
. = Adjacent Marsh, Runoff

SAMPLING DAY

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463 = APRIL 7, 1976
477 = APRIL 21, 1976
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520 = JUNE 3, 1976
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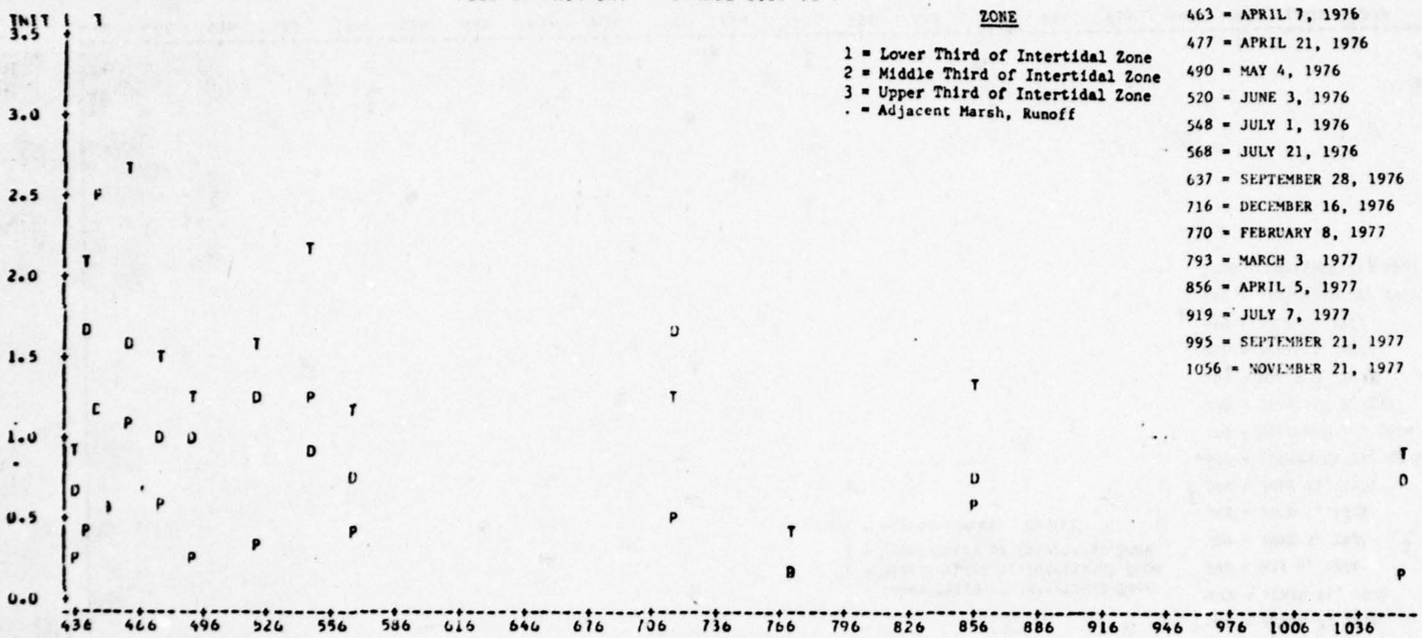
770 = FEBRUARY 8, 1977
793 = MARCH 3 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

FRACTION OF TOTAL NITROGEN IN BUTTERMILK SOUND INTERSTITIAL WATER 20:35

ZONE=3

PLOT OF TNIT*DAY SYMBOL USED IS T
PLOT OF DNIT*DAY SYMBOL USED IS D
PLOT OF PNIT*DAY SYMBOL USED IS P



NOTE: 12 OBS HAD MISSING VALUES

SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16, 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
490 = MAY 4, 1976
520 = JUNE 3, 1976
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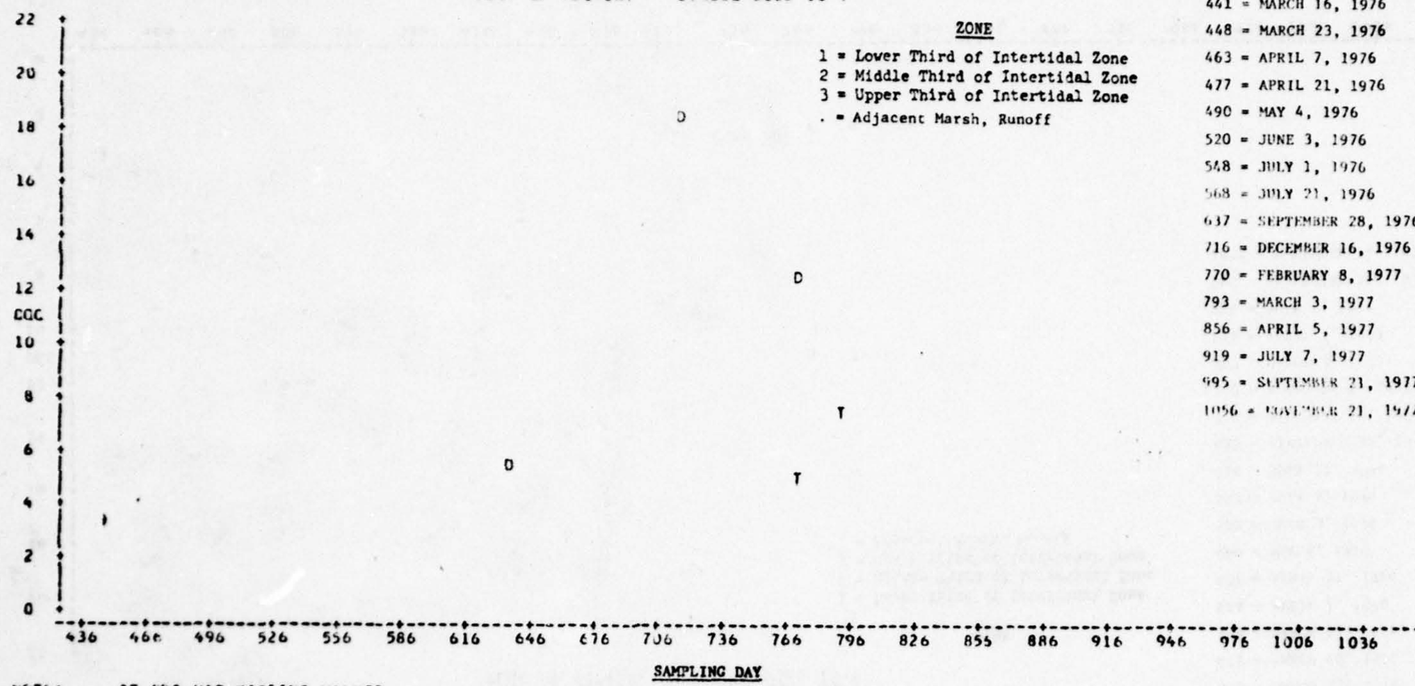
568 = JULY 21, 1976
637 = SEPTEMBER 28, 1976
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

B298

TOTAL AND DISSOLVED ORGANIC CARBON FROM BUTTERMILK SOUND INTERSTITIAL WATER 20:35

ZONE=1

PLOT OF DOC*DAY SYMBOL USED IS D
PLOT OF TOC*DAY SYMBOL USED IS T



ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone
. = Adjacent Marsh, Runoff

SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16, 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
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520 = JUNE 3, 1976
548 = JULY 1, 1976
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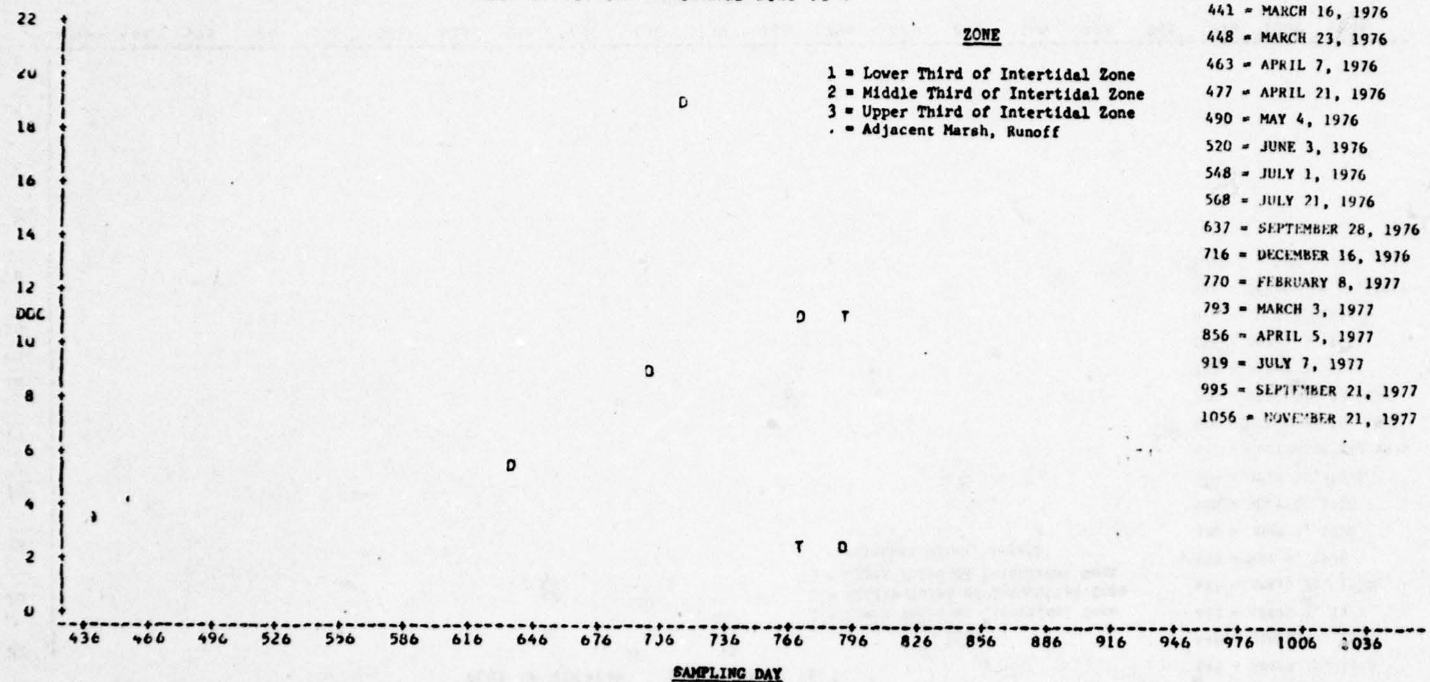
637 = SEPTEMBER 28, 1976
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3, 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

NOTE: 27 OBS HAD MISSING VALUES

TOTAL AND DISSOLVED ORGANIC CARBON FROM BUTTERMILK SOUND INTERSTITIAL WATER 20:35

ZONE=2

PLOT OF DOC*DAY SYMBOL USED IS D
PLOT OF TOC*DAY SYMBOL USED IS T



NOTE: 29 OBS HAD MISSING VALUES

SAMPLING DAY

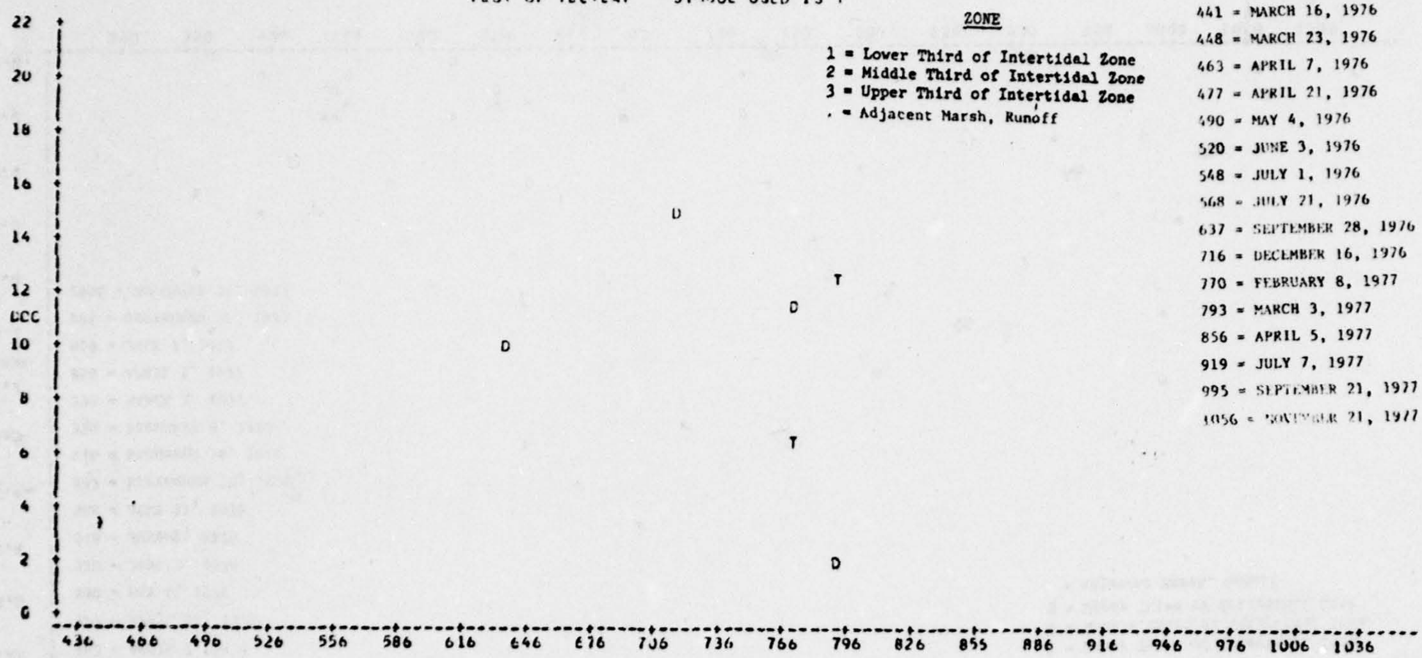
390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16, 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
490 = MAY 4, 1976
520 = JUNE 3, 1976
548 = JULY 1, 1976
568 = JULY 21, 1976
637 = SEPTEMBER 28, 1976
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3, 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

B300

TOTAL AND DISSOLVED ORGANIC CARBON FROM BUTTERMILK SOUND INTERSTITIAL WATER 20:35

ZONE=3

PLOT OF DOC*DAY SYMBOL USED IS D
PLOT OF TOC*DAY SYMBOL USED IS T



SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16, 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
490 = MAY 4, 1976
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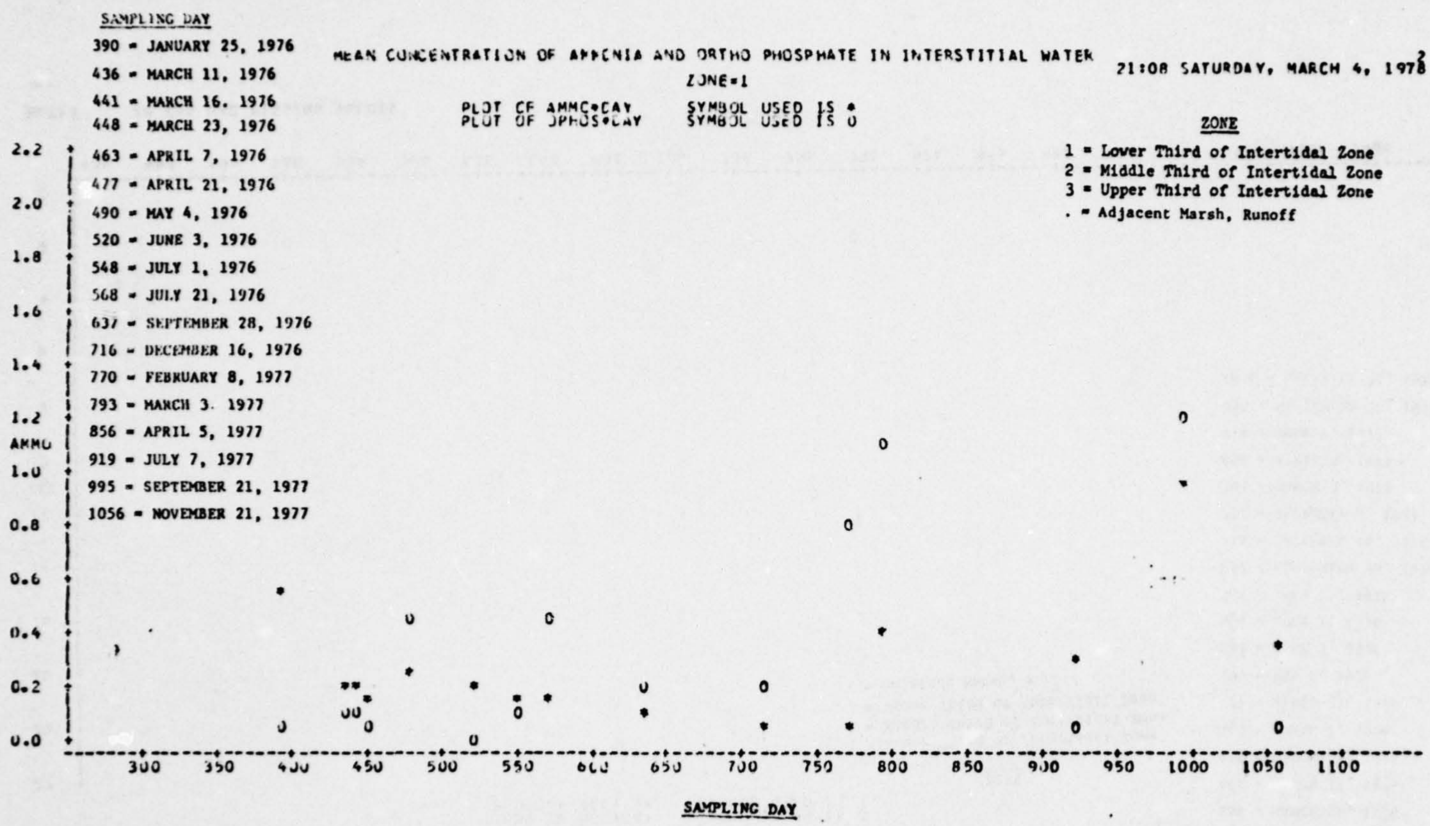
637 = SEPTEMBER 28, 1976
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3, 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

NOTE: 28 OBS HAD MISSING VALUES

MEAN CONCENTRATION OF AMMONIA AND ORTHO PHOSPHATE IN INTERSTITIAL WATER   21:08 SATURDAY, MARCH 4, 1978 2

ZONE=1

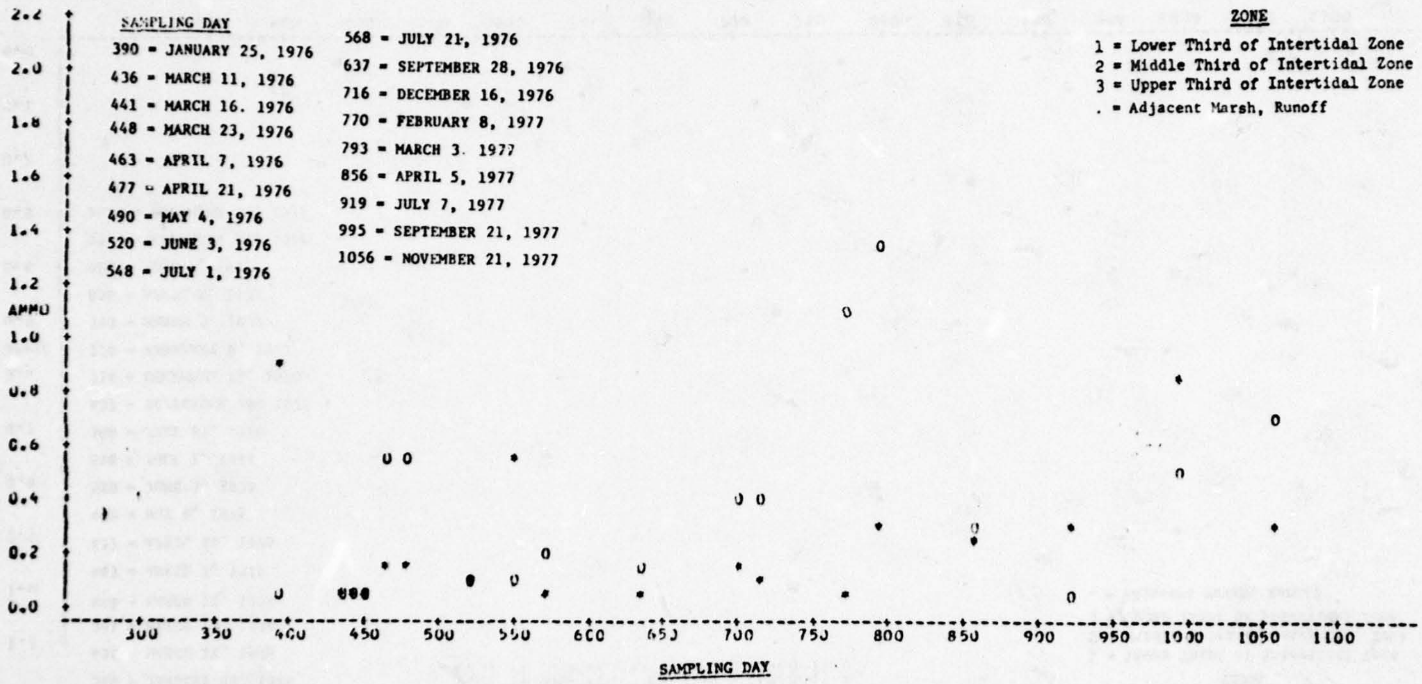


B302

MEAN CONCENTRATION OF AMMONIA AND ORTHO PHOSPHATE IN INTERSTITIAL WATER 21:08 SATURDAY, MARCH 4, 1978 3

ZONE=2

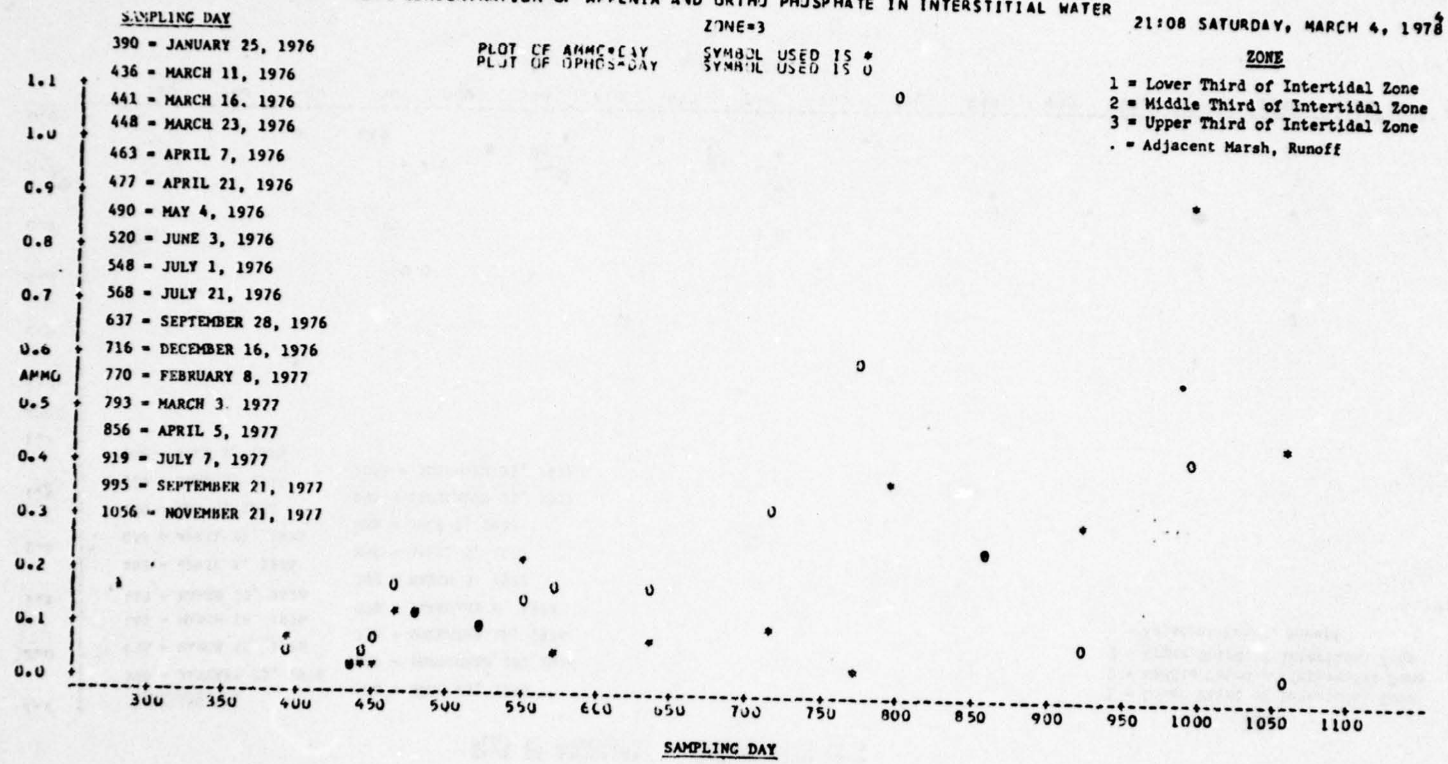
PLOT OF AMMO*DAY SYMBOL USED IS *
PLOT OF OPHOS*DAY SYMBOL USED IS 0



MEAN CONCENTRATION OF AMMONIA AND ORTHO PHOSPHATE IN INTERSTITIAL WATER

ZONE=3

21:08 SATURDAY, MARCH 4, 1978



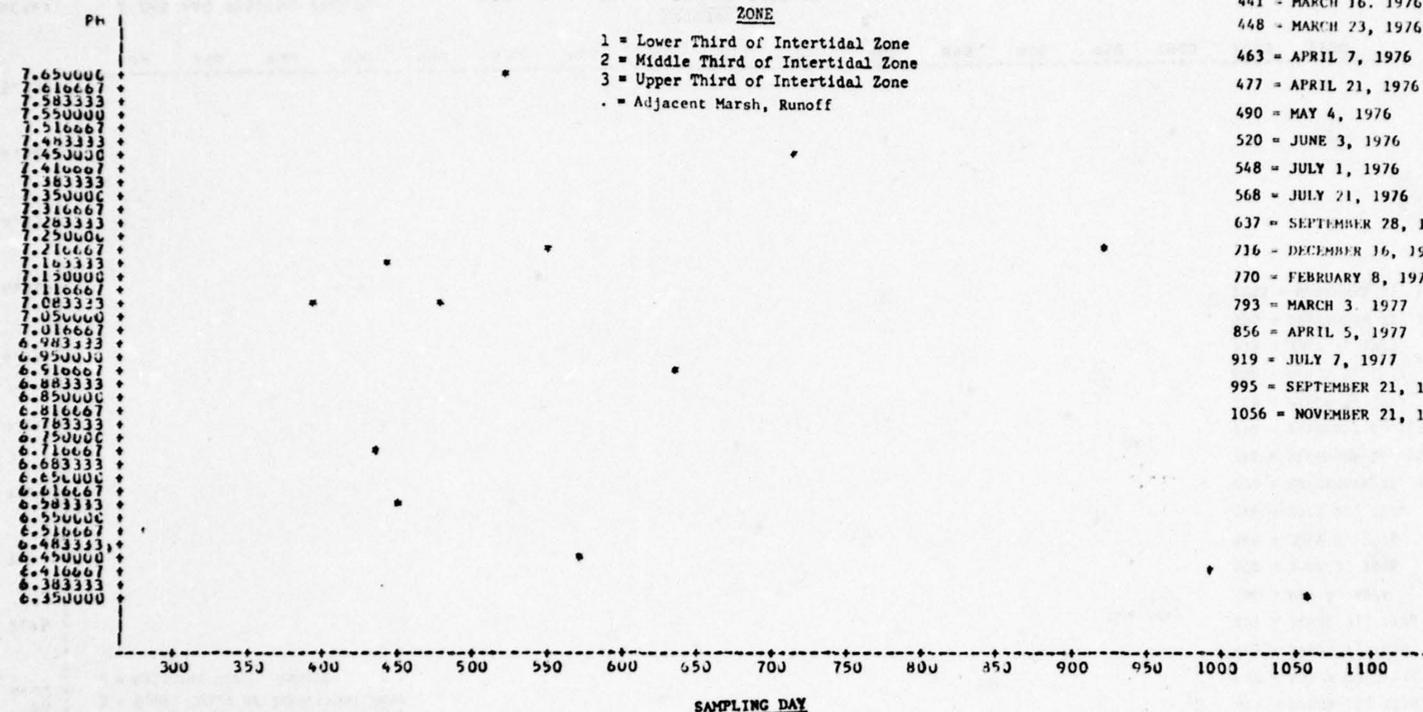
PH OF BUTTERMILK SOUND INTERSTITIAL WATER
ZONE=1

21:08 SATURDAY,

PLOT OF PH*DAY   SYMBOL USED IS *

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone
. = Adjacent Marsh, Runoff



SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16, 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
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716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3, 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

NOTE: 2 OBS HAD MISSING VALUES

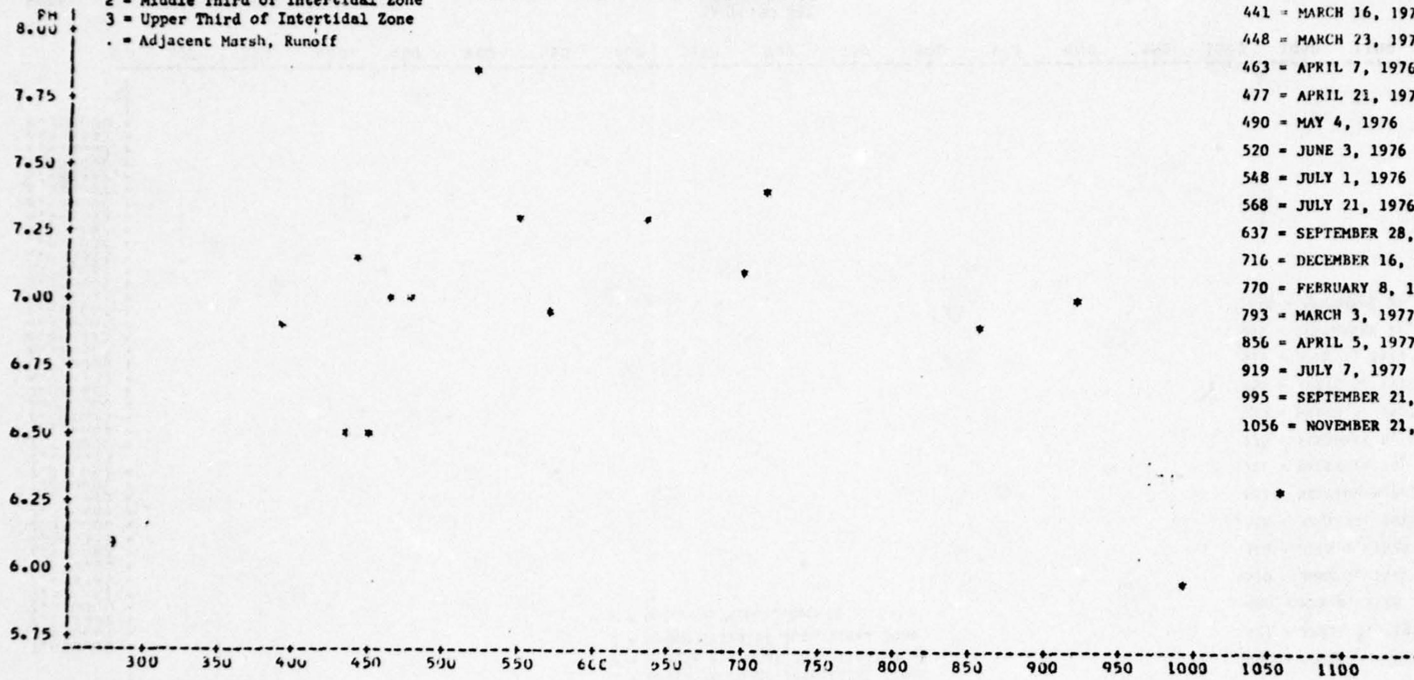
PH OF BUTTERMILK SOUND INTERSTITIAL WATER
ZONE=2

21:08 SATURDAY,

PLOT OF PH*DAY   SYMBOL USED IS *

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone
. = Adjacent Marsh, Runoff



NOTE: 2 OBS HAD MISSING VALUES

SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16, 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
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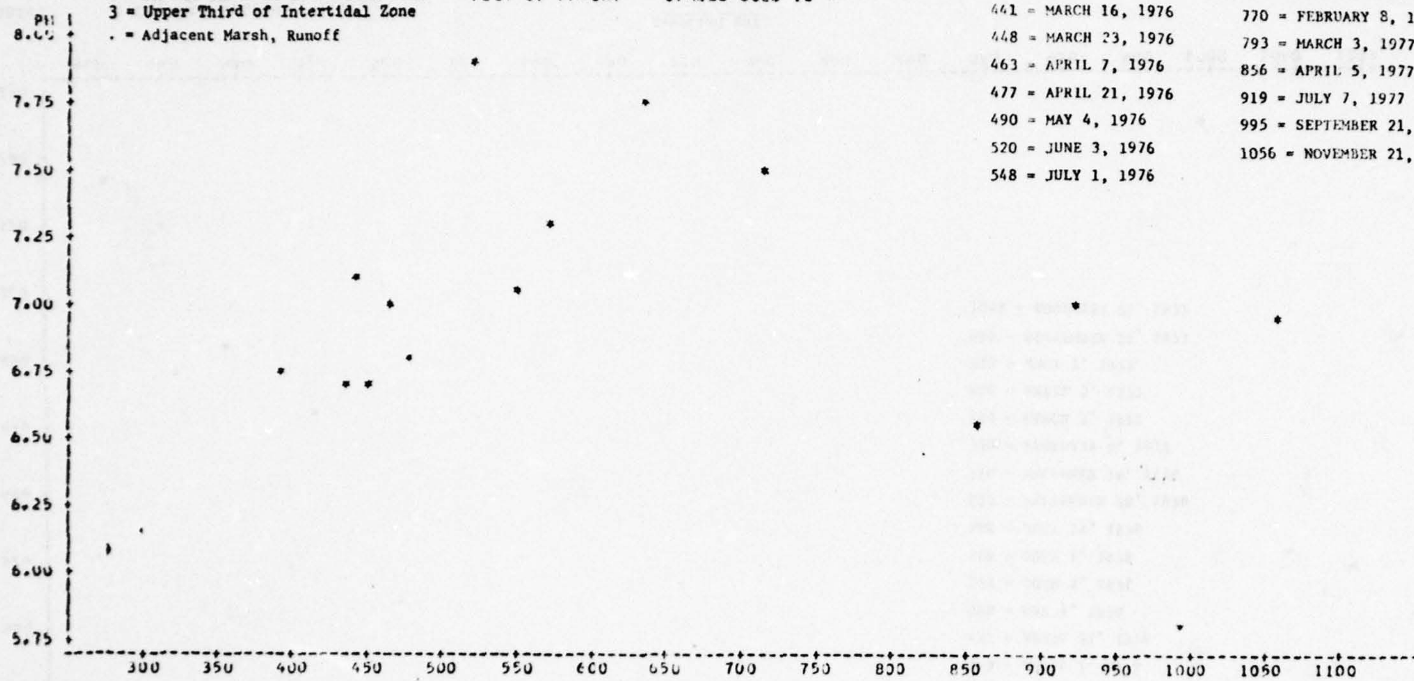
637 = SEPTEMBER 28, 1976
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3, 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

PH OF BUTTERMILK SOUND INTERSTITIAL WATER
ZONE=3

PLOT OF PH*DAY SYMBOL USED IS *

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone
. = Adjacent Marsh, Runoff



SAMPLING DAY

390 = JANUARY 25, 1976	568 = JULY 21, 1976
436 = MARCH 11, 1976	637 = SEPTEMBER 28, 1976
441 = MARCH 16, 1976	716 = DECEMBER 16, 1976
448 = MARCH 23, 1976	770 = FEBRUARY 8, 1977
463 = APRIL 7, 1976	793 = MARCH 3, 1977
477 = APRIL 21, 1976	856 = APRIL 5, 1977
490 = MAY 4, 1976	919 = JULY 7, 1977
520 = JUNE 3, 1976	995 = SEPTEMBER 21, 1977
548 = JULY 1, 1976	1056 = NOVEMBER 21, 1977

NOTE: 2 OBS HAD MISSING VALUES

EH OF BUTTERMILK SOUND INTERSTITIAL WATER , MARCH 4, 1978 8
ZONE=1

PLOT OF EH*DAY SYMBOL USED IS *

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone
. = Adjacent Marsh, Runoff

SAMPLING DAY

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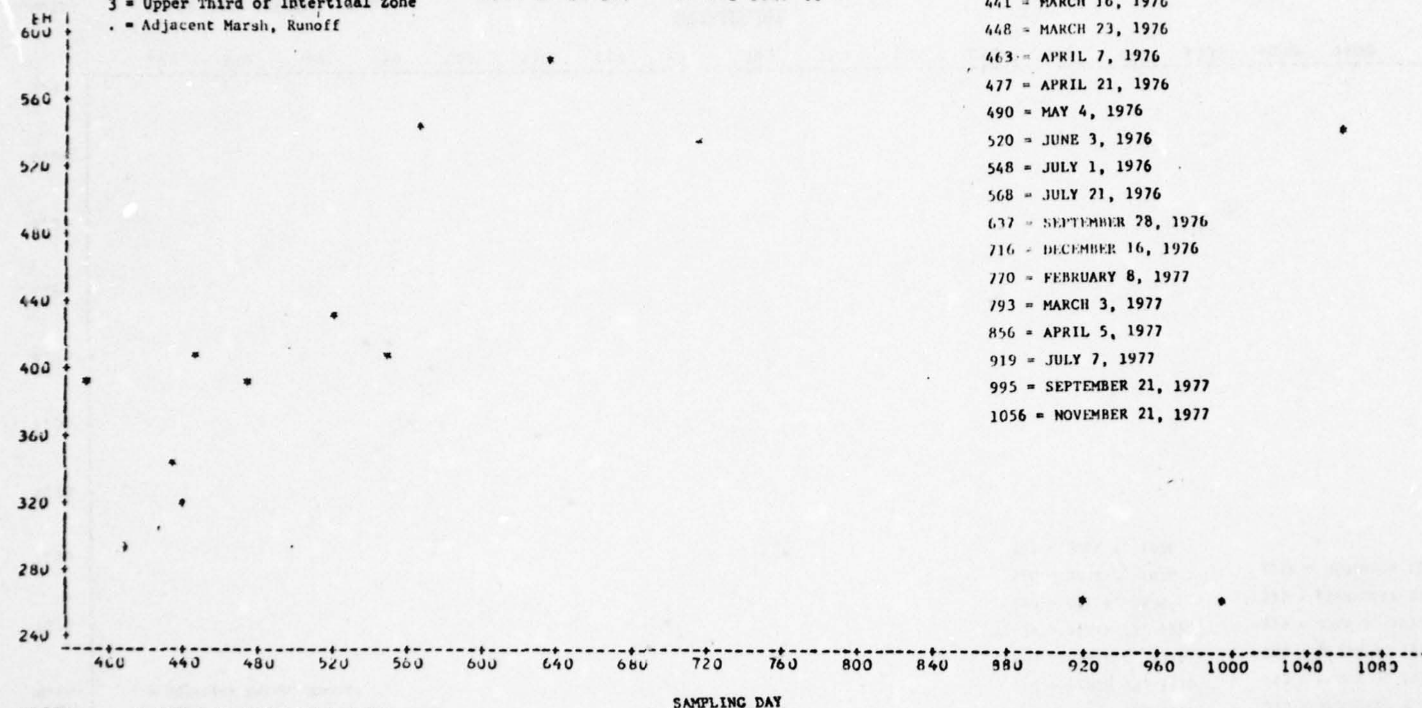
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

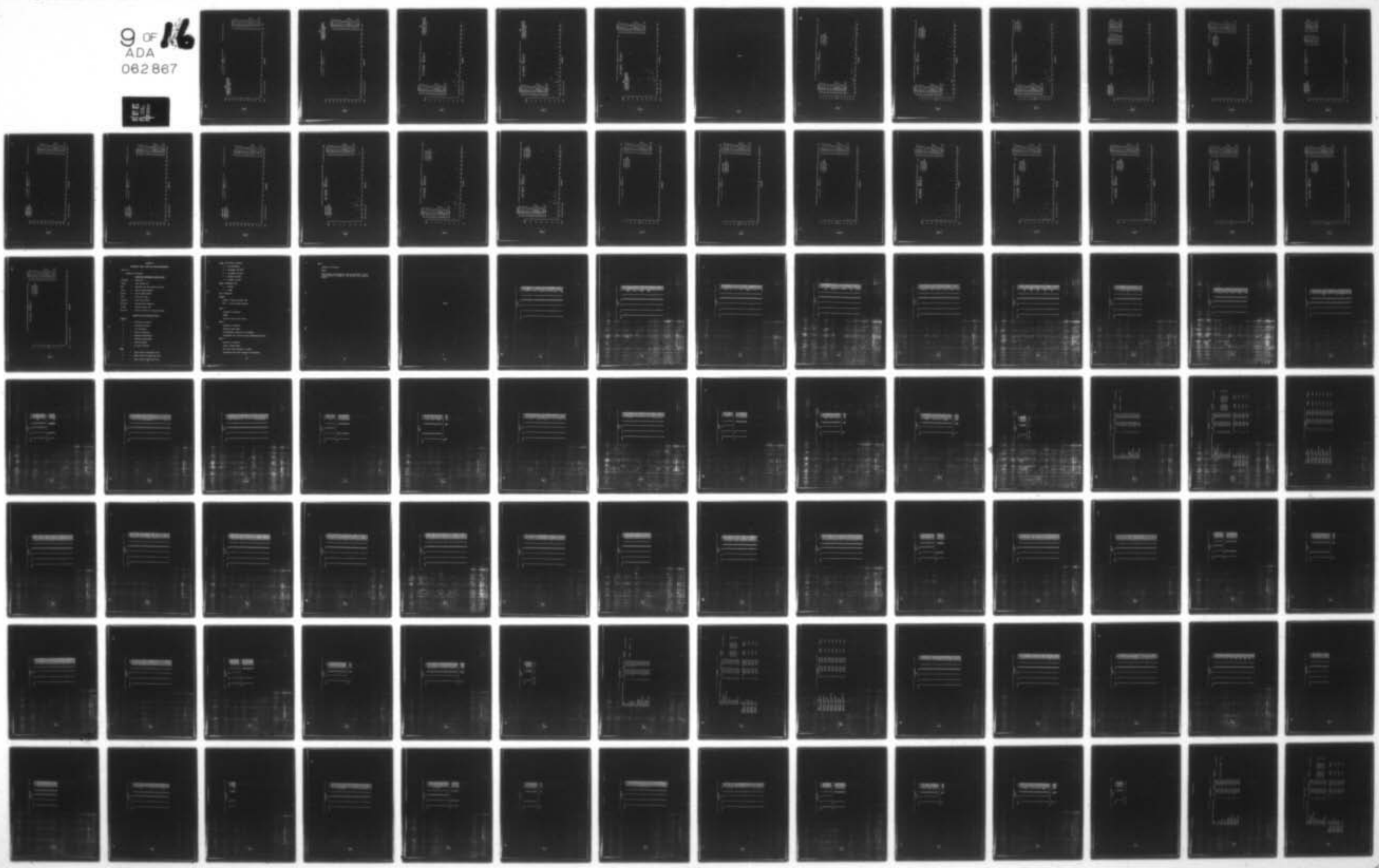


NOTE: 2 OBS HAD MISSING VALUES

AD-A062 867 GEORGIA UNIV BRUNSWICK MARINE EXTENSION SERVICE F/G 13/2
HABITAT DEVELOPMENT FIELD INVESTIGATIONS BUTTERMILK SOUND MARSH--ETC(U)
JUL 78 R J REIMOLD, M A HARDISKY, P C ADAMS DACW21-75-C-0074

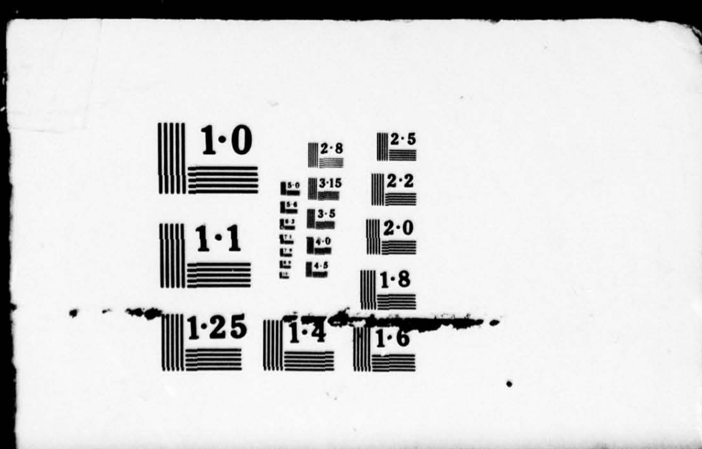
UNCLASSIFIED WES-TR-D-78-26-APP-A NL

9 OF 16
ADA
062867



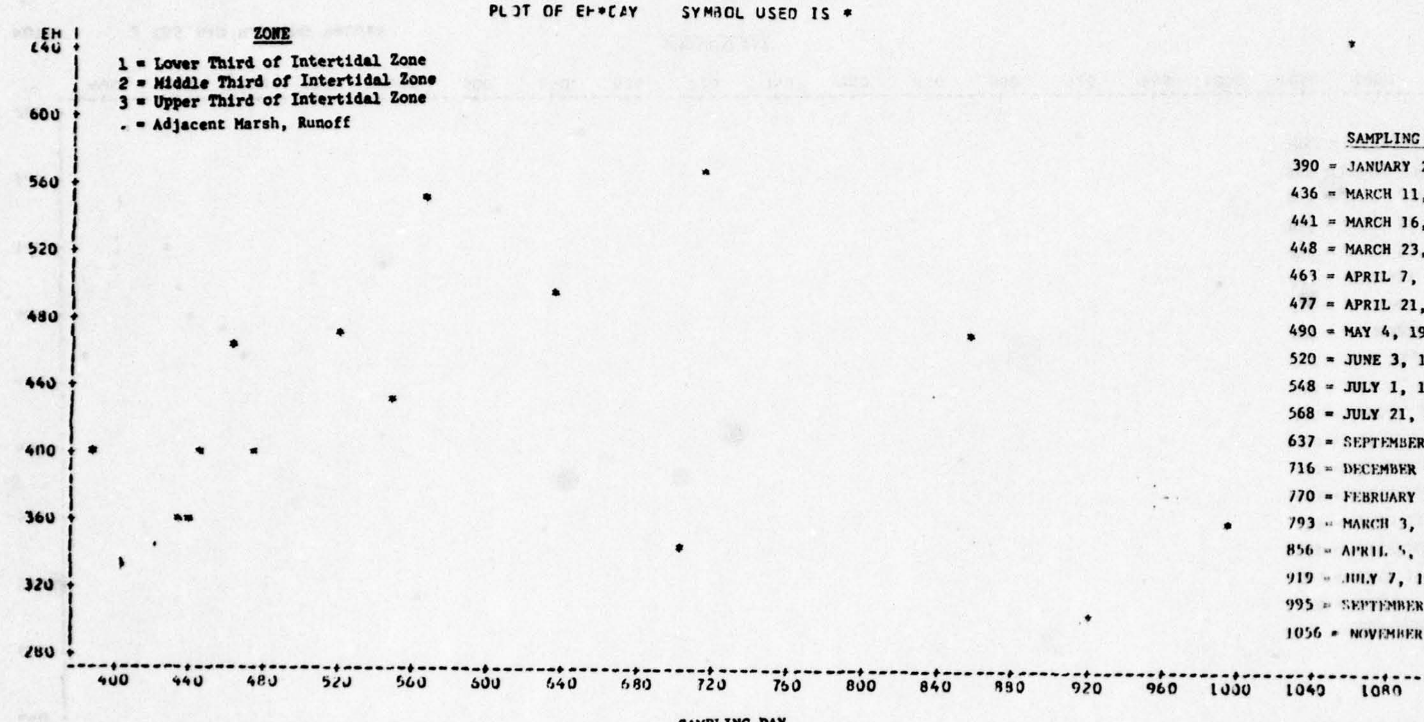
9 OF 16

ADA
062867



EH OF BUTTERMILK SOUND INTERSTITIAL WATER 21:08 SATURDAY, MARCH 4, 1978 9
ZONE=2

PLOT OF EH*DAY SYMBOL USED IS *



SAMPLING DAY

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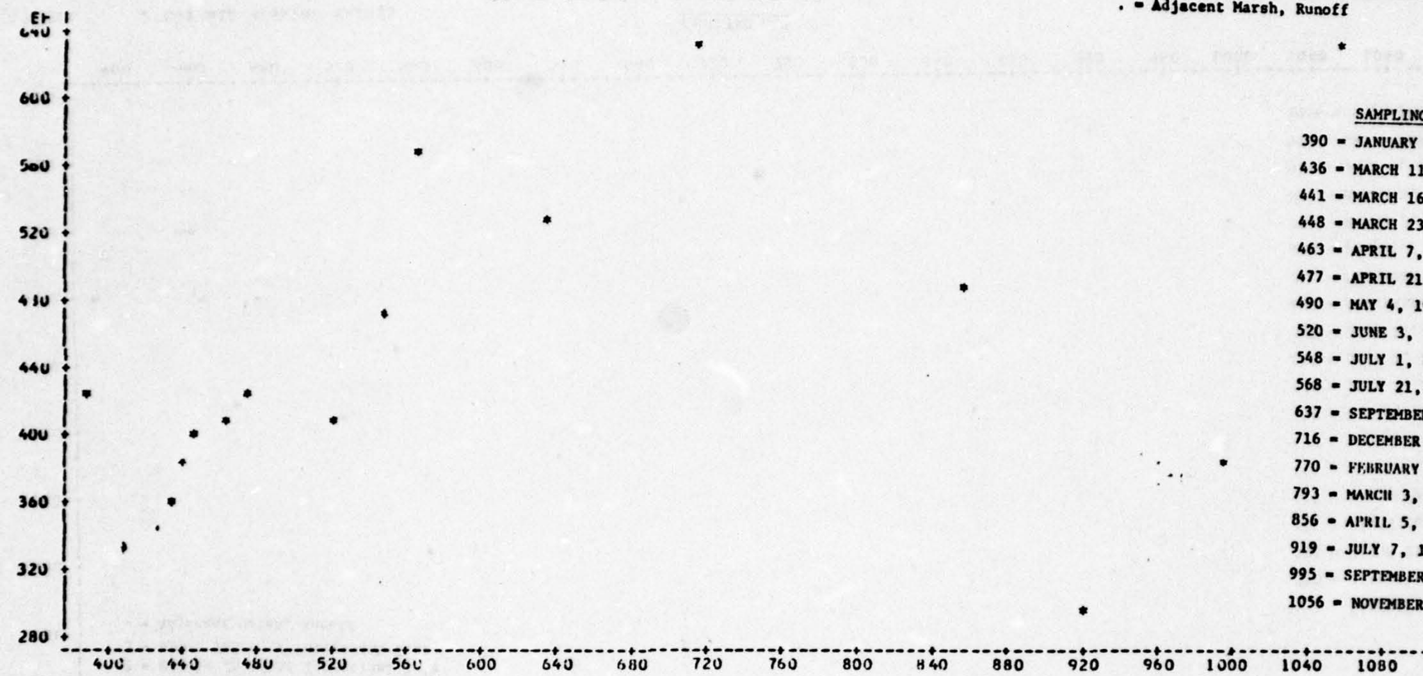
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3, 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

NOTE: 2 OBS HAD MISSING VALUES

EH OF BUTTERMILK SOUND INTERSTITIAL WATER
ZONE=3

PLOT OF EH*DAY   SYMBOL USED IS *



NOTE: 2 OBS HAD MISSING VALUES

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone
. = Adjacent Marsh, Runoff

SAMPLING DAY

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793 = MARCH 3, 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

FRACTIONS OF TOTAL PHOSPHORUS IN BUTTERMILK SOUND INTERSTITIAL WATER

ZONE=1

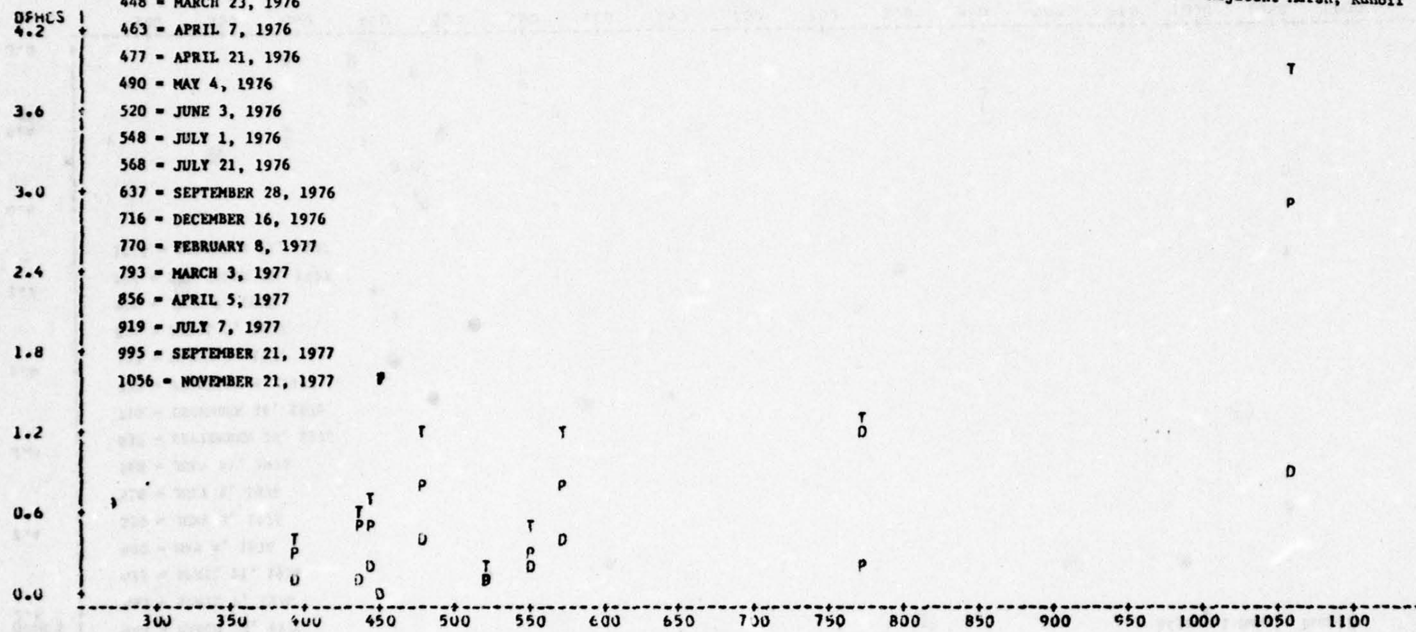
PLOT OF OPHOS*DAY SYMBOL USED IS D
PLOT OF PPHOS*DAY SYMBOL USED IS P
PLOT OF TPHOS*DAY SYMBOL USED IS T

SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16, 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
490 = MAY 4, 1976
520 = JUNE 3, 1976
548 = JULY 1, 1976
568 = JULY 21, 1976
637 = SEPTEMBER 28, 1976
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3, 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone
. = Adjacent Marsh, Runoff



SAMPLING DAY

NOTE: 15 OBS HAD MISSING VALUES

FRACTIONS OF TOTAL PHOSPHORUS IN BUTTERMILK SOUND INTERSTITIAL WATER

ZONE=2

PLOT OF DPHOS*DAY SYMBOL USED IS D
PLOT OF FPHOS*DAY SYMBOL USED IS P
PLOT OF TPHOS*DAY SYMBOL USED IS T

SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16, 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
490 = MAY 4, 1976
520 = JUNE 3, 1976
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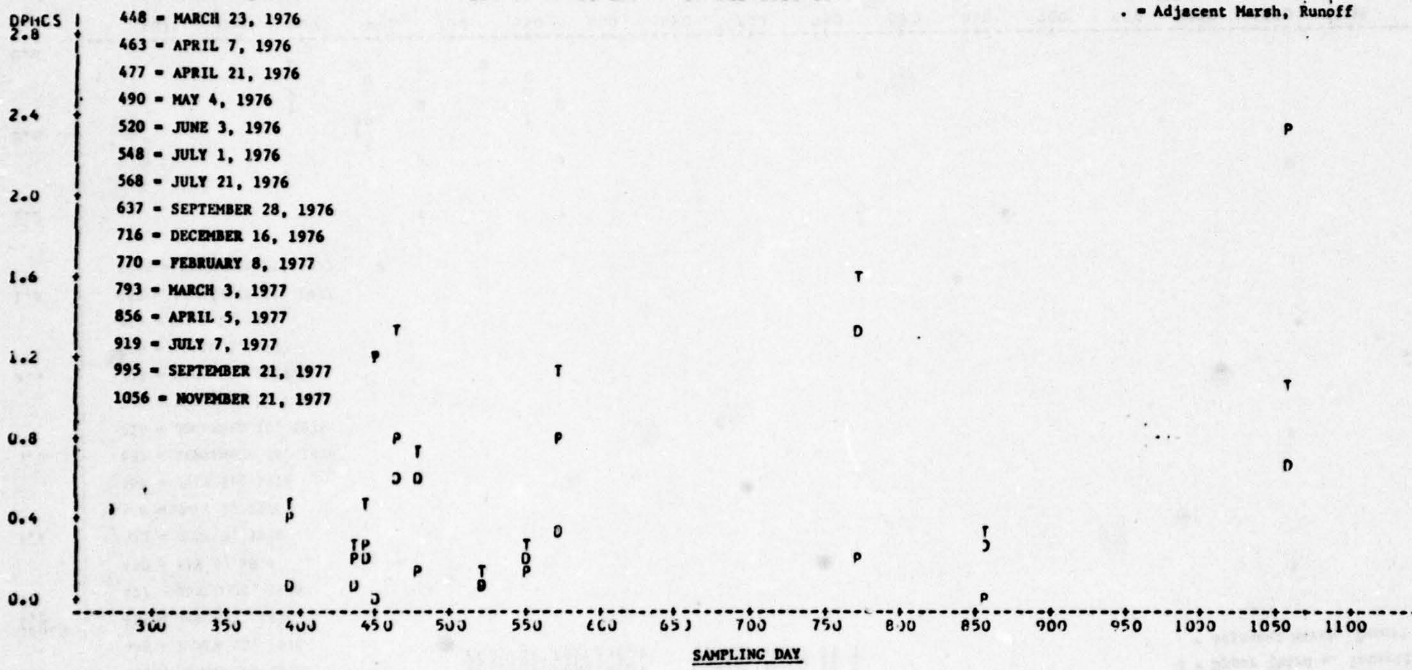
637 = SEPTEMBER 28, 1976
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3, 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone
. = Adjacent Marsh, Runoff



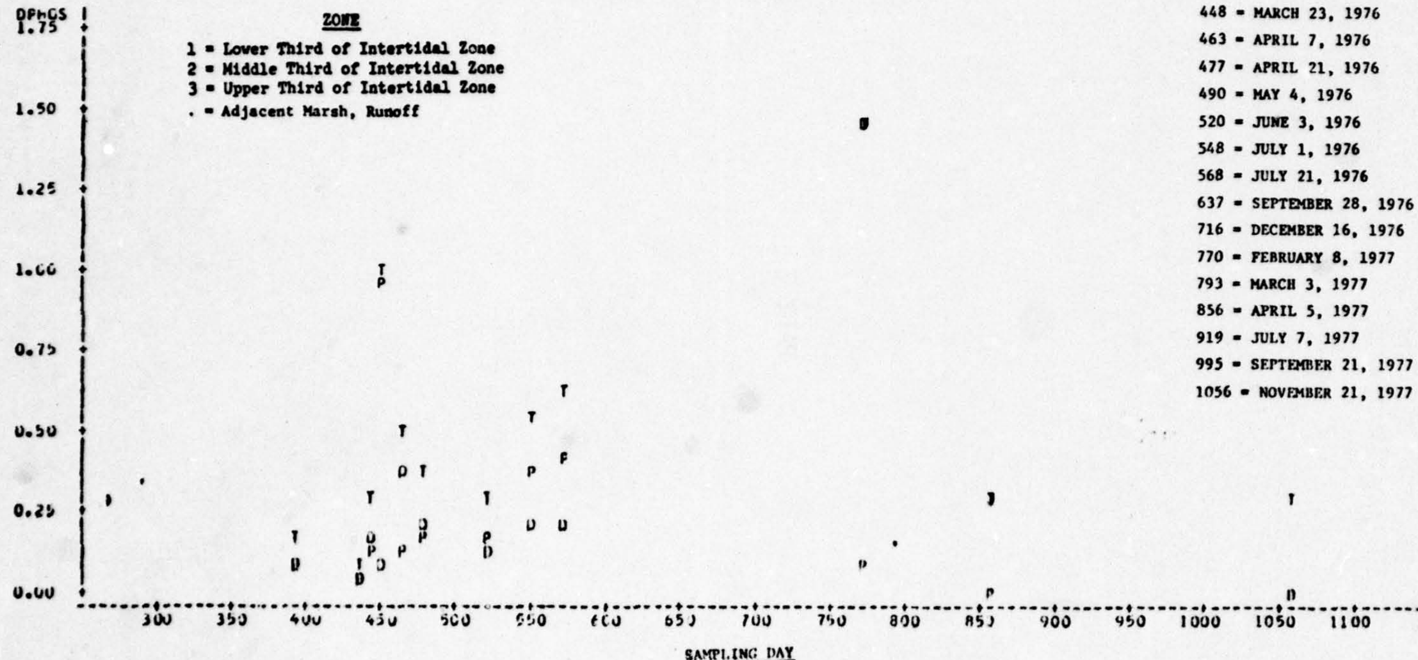
NOTE: 18 OBS HAD MISSING VALUES

B312

FRACTIONS OF TOTAL PHOSPHORUS IN BUTTERMILK SOUND INTERSTITIAL WATER 21:08

ZONE=3

PLOT OF DPHOS*DAY SYMBOL USED IS D
PLOT OF PPHOS*DAY SYMBOL USED IS P
PLOT OF TPHOS*DAY SYMBOL USED IS T



NOTE: 15 OBS HAD MISSING VALUES

SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16, 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
490 = MAY 4, 1976
520 = JUNE 3, 1976
548 = JULY 1, 1976
568 = JULY 21, 1976
637 = SEPTEMBER 28, 1976
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3, 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

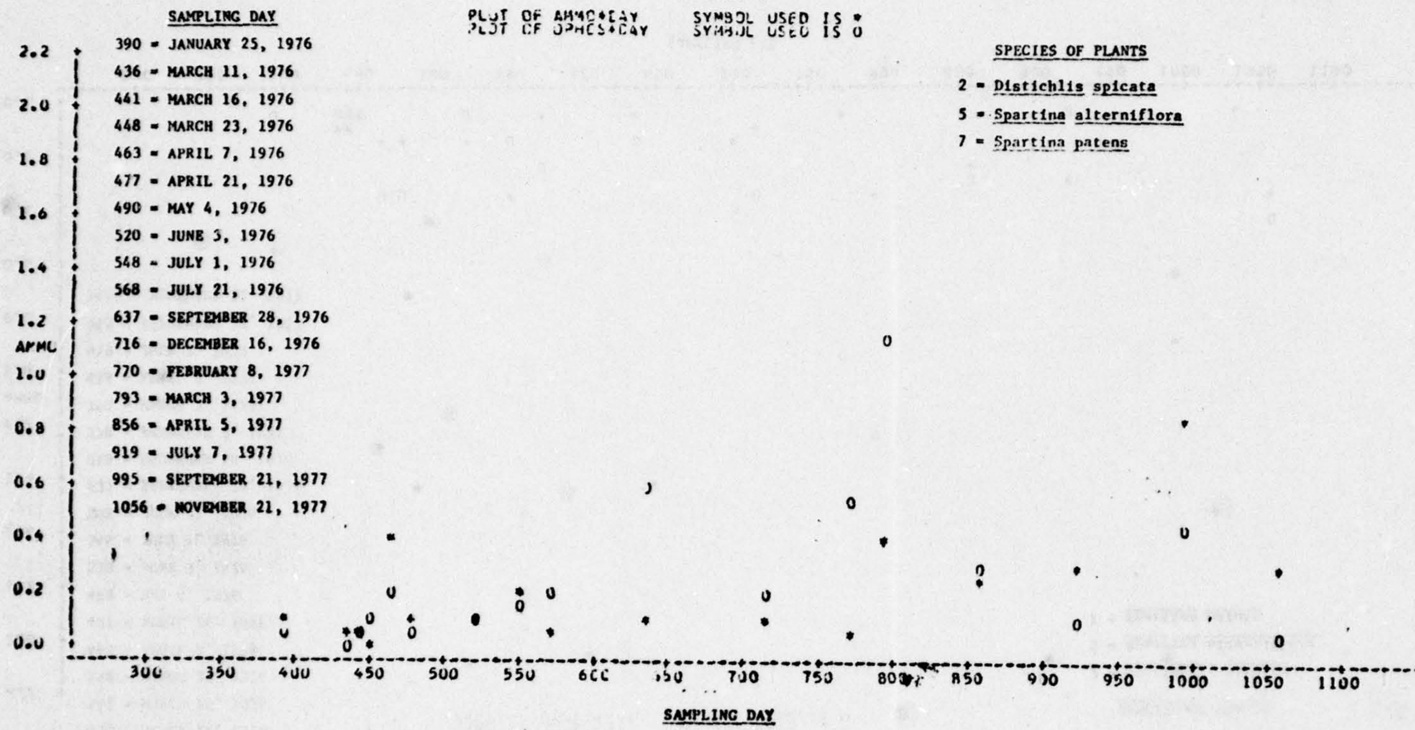
B313

PART 7

MEAN CONCENTRATION OF AMMONIA AND ORTHO PHOSPHATE IN INTERSTITIAL WATER 21:05 SATURDAY, MARCH 4, 1978 3

SPECIE=2

PLOT OF AMMO*DAY SYMBOL USED IS *
PLOT OF OPHOS*DAY SYMBOL USED IS 0



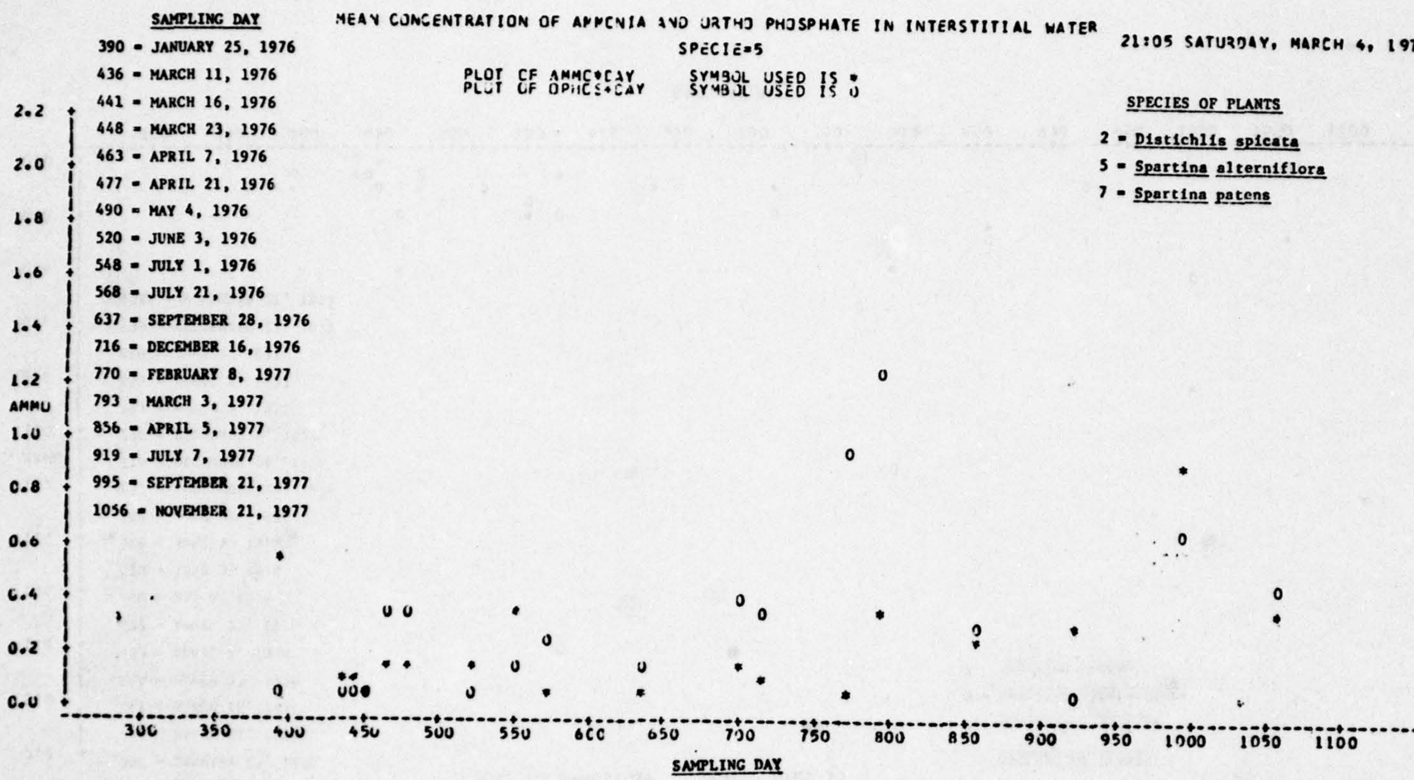
B315

MEAN CONCENTRATION OF AMMONIA AND ORTHO PHOSPHATE IN INTERSTITIAL WATER

21:05 SATURDAY, MARCH 4, 1978

SPECIE=5

PLOT OF AMMO*DAY SYMBOL USED IS *
PLOT OF OPHOS*DAY SYMBOL USED IS 0



SPECIES OF PLANTS

2 = *Distichlis spicata*

5 = *Spartina alterniflora*

7 = *Spartina patens*

B316

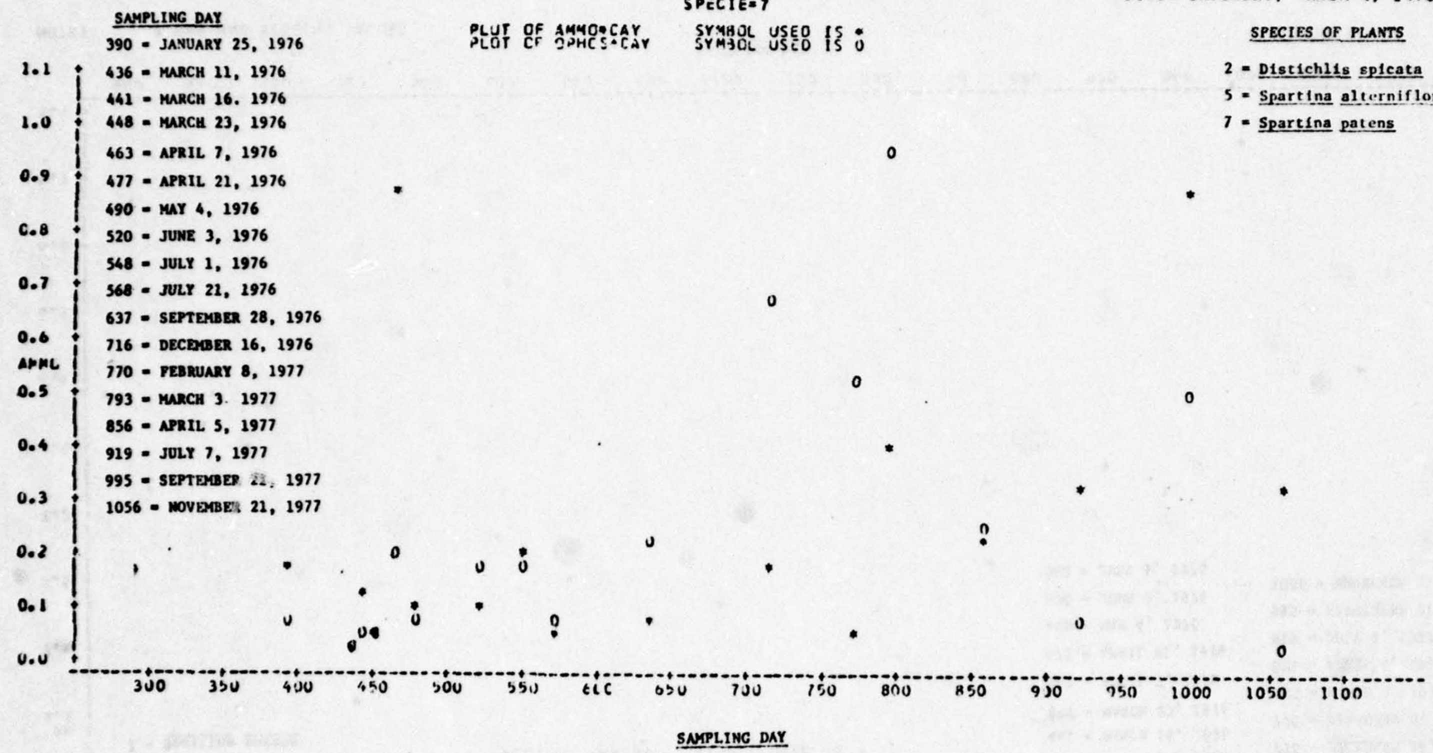
MEAN CONCENTRATION OF AMMONIA AND ORTHO PHOSPHATE IN INTERSTITIAL WATER 21:05 SATURDAY, MARCH 4, 1978

SPECIE=7

PLOT OF AMMO*DAY SYMBOL USED IS *
PLOT OF OPHOS*DAY SYMBOL USED IS 0

SPECIES OF PLANTS

2 = *Distichlis spicata*
5 = *Spartina alterniflora*
7 = *Spartina patens*



B317

SPECIES OF PLANTS

2 = *Distichlis spicata*

5 = *Spartina alterniflora*

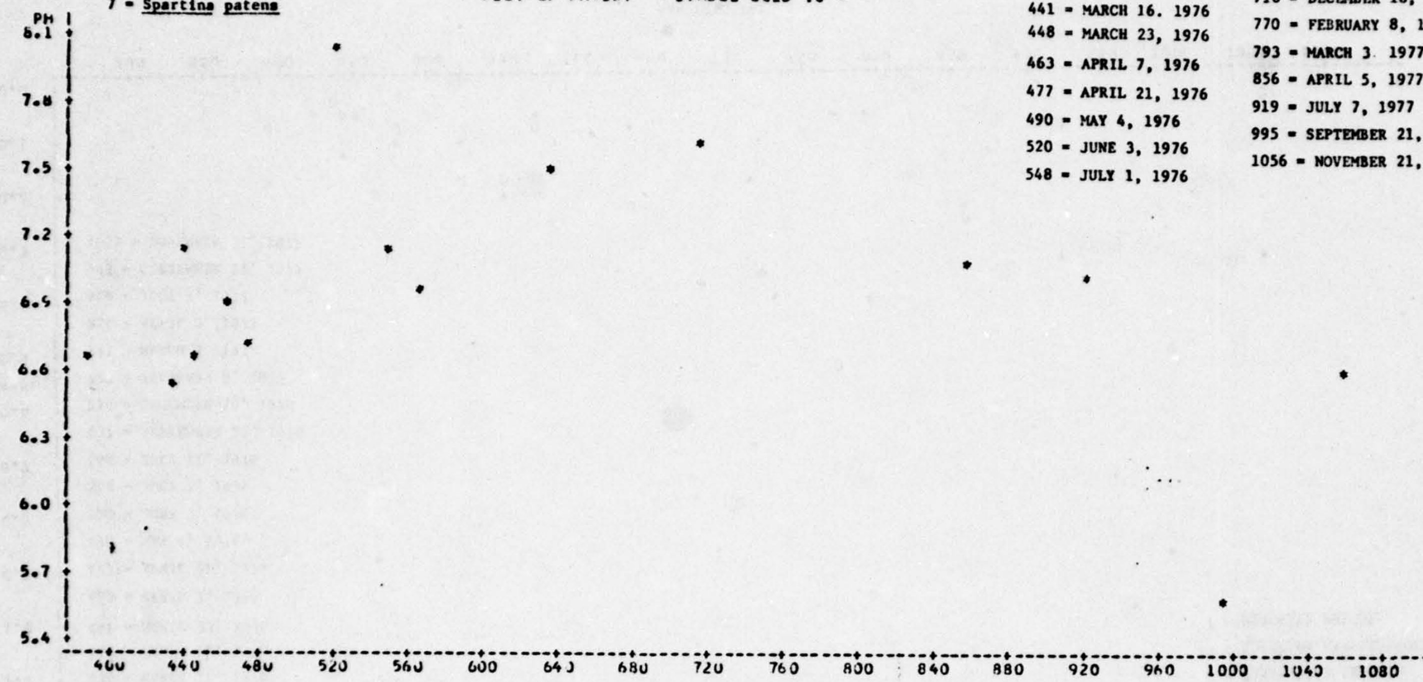
7 = *Spartina patens*

PH OF BUTTERMILK SOUND INTERSTITIAL WATER
SPECIE=2

PLOT OF PH*DAY   SYMBOL USED IS *

SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16, 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
490 = MAY 4, 1976
520 = JUNE 3, 1976
548 = JULY 1, 1976
568 = JULY 21, 1976
637 = SEPTEMBER 28, 1976
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3, 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

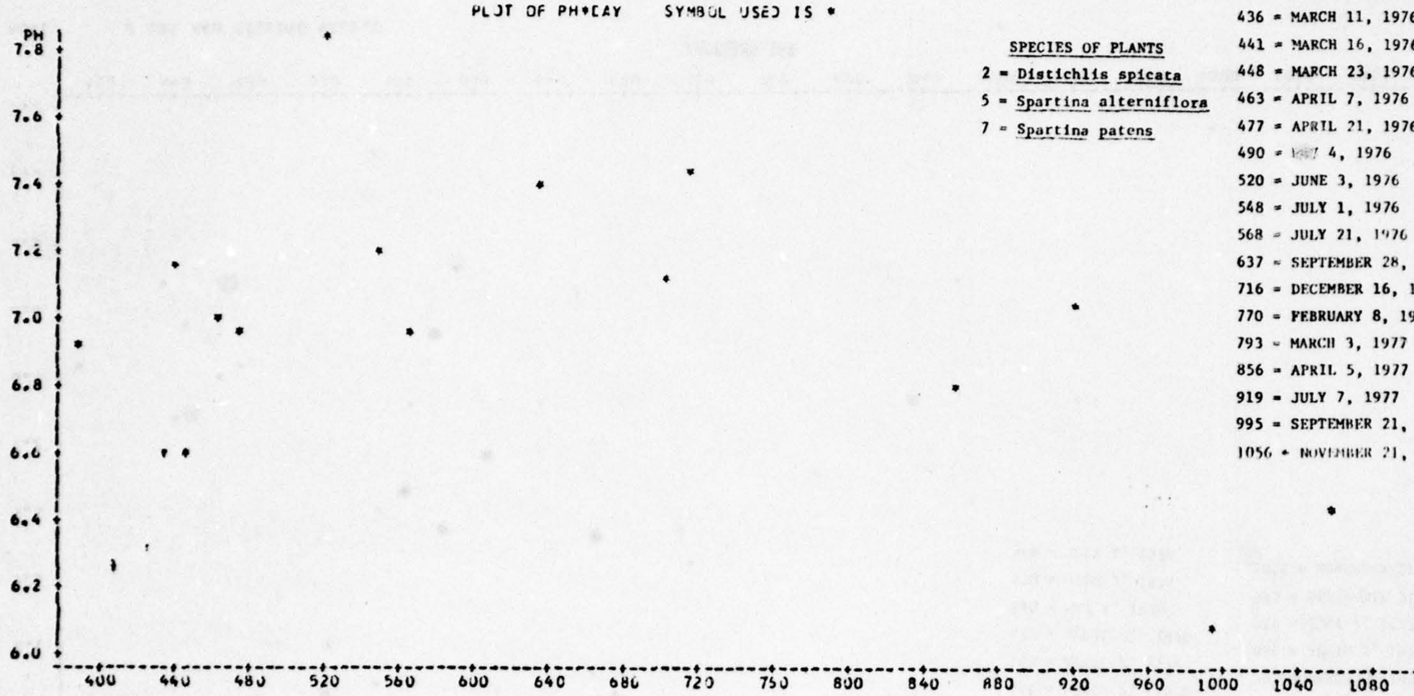


NOTE: 2 OBS HAD MISSING VALUES

PH OF BUTTERMILK SOUND INTERSTITIAL WATER
SPECIE=5

21:05 SATURDAY,

PLOT OF PH*DAY SYMBOL USED IS *



NOTE: 2 OBS HAD MISSING VALUES

SPECIES OF PLANTS

2 = *Distichlis spicata*
5 = *Spartina alterniflora*
7 = *Spartina patens*

SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16, 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
490 = MAY 4, 1976
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637 = SEPTEMBER 28, 1976
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770 = FEBRUARY 8, 1977
793 = MARCH 3, 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

B319

PH OF BUTTERMILK SOUND INTERSTITIAL WATER
SPECIE=7

PLOT OF PH*D/Y SYMBOL USED IS *

SPECIES OF PLANTS

2 = *Distichlis spicata*
5 = *Spartina alterniflora*
7 = *Spartina patens*

SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16, 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
490 = MAY 4, 1976
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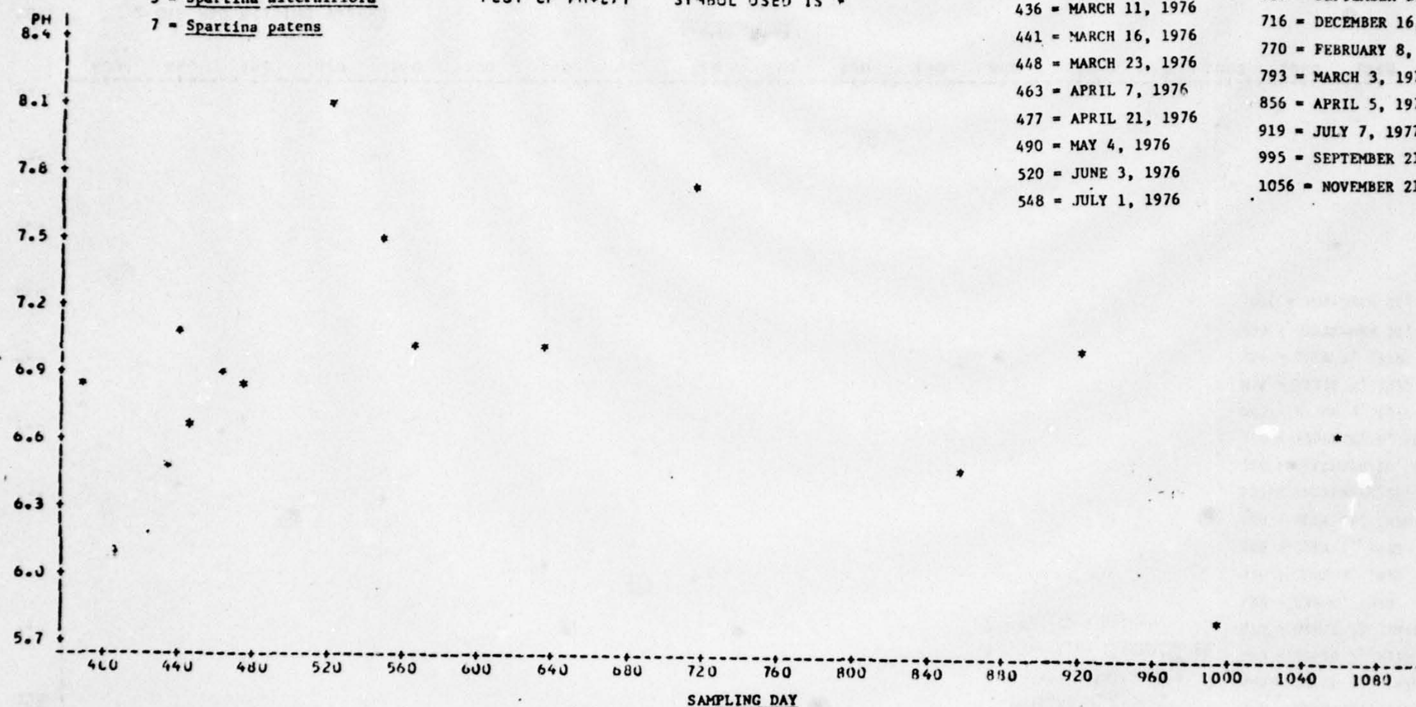
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977



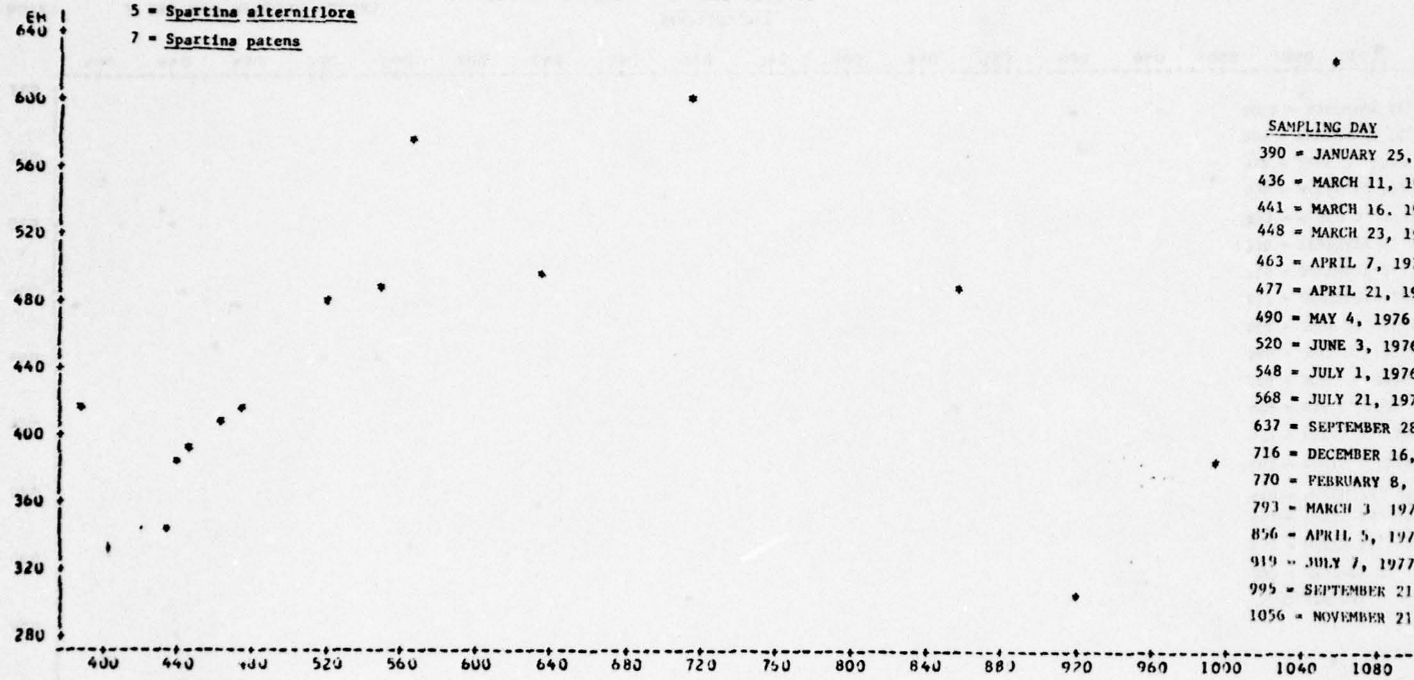
NOTE: 2 OBS HAD MISSING VALUES

EH OF BUTTERMILK SOUND INTERSTITIAL WATER 21:05 SATURDAY, MARCH 4, 1978 9
SPECIE=2

SPECIES OF PLANTS

2 = *Distichlis spicata*
5 = *Spartina alterniflora*
7 = *Spartina patens*

PLOT OF EH*DAY SYMBOL USED IS *



SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16. 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
490 = MAY 4, 1976
520 = JUNE 3, 1976
548 = JULY 1, 1976
568 = JULY 21, 1976
637 = SEPTEMBER 28, 1976
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

NOTE: 2 OBS HAD MISSING VALUES

B321

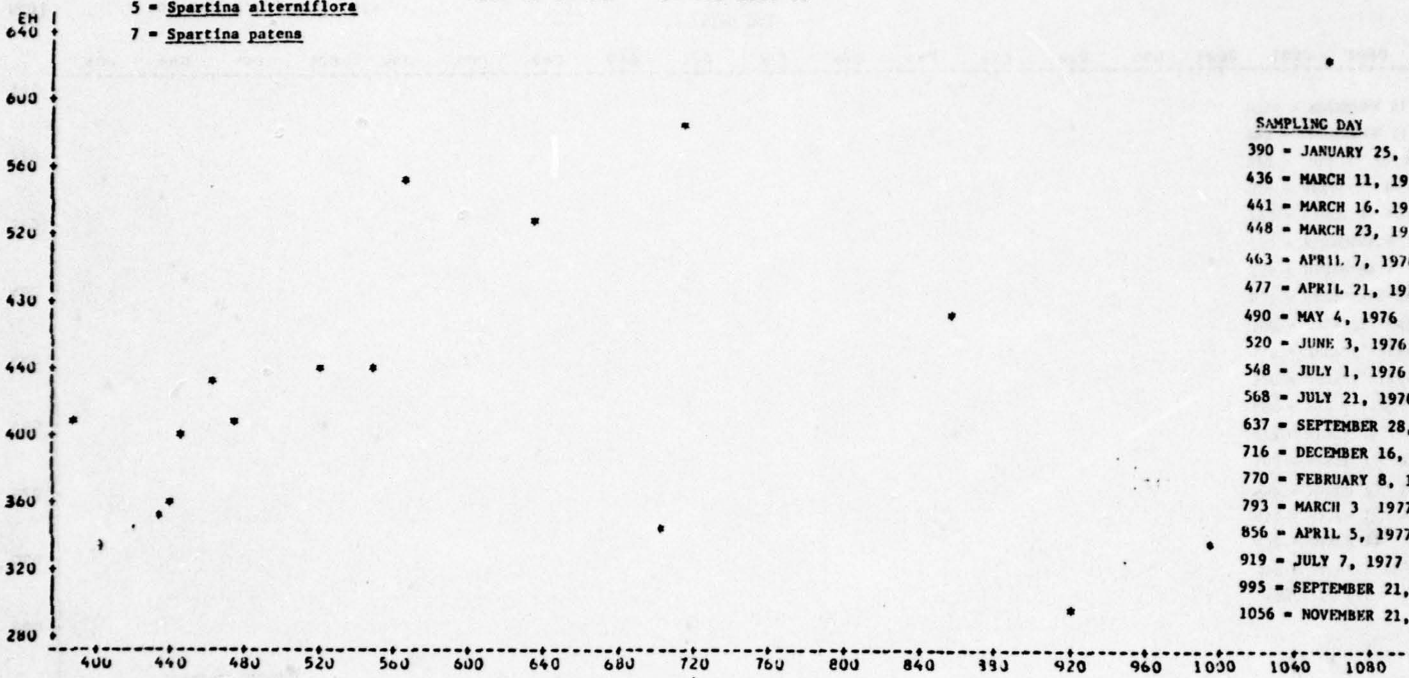
21:05 SATURDAY, MARCH 4, 1978 10

EH OF BUTTERMILK SOUND INTERSTITIAL WATER
SPECIE=5

SPECIES OF PLANTS

2 = *Distichlis spicata*
5 = *Spartina alterniflora*
7 = *Spartina patens*

PLOT OF EH*DAY SYMBOL USED IS *



SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16, 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
490 = MAY 4, 1976
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568 = JULY 21, 1976
637 = SEPTEMBER 28, 1976
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

NOTE: 2 OBS HAD MISSING VALUES

B322

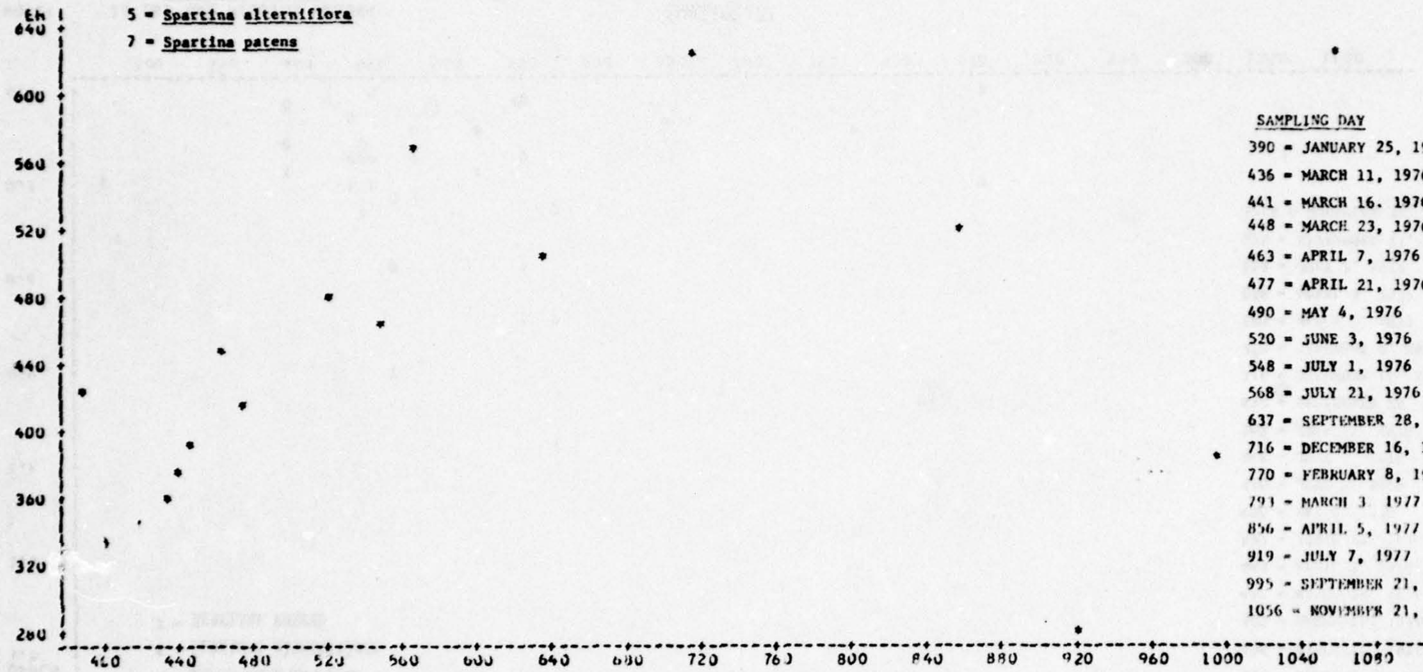
EH OF BUTTERMILK SOUND INTERSTITIAL WATER 21:05 SATURDAY, MARCH 4, 1978 11

SPECIE=7

SPECIES OF PLANTS

2 = *Distichlis spicata*
5 = *Spartina alterniflora*
7 = *Spartina patens*

PLOT OF EH*DAY SYMBOL USED IS *



SAMPLING DAY

SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16, 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
490 = MAY 4, 1976
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568 = JULY 21, 1976
637 = SEPTEMBER 28, 1976
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3, 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

NOTE: 2 OBS HAD MISSING VALUES

B323

FRACTIONS OF TOTAL PHOSPHORUS IN BUTTERMILK SOUND INTERSTITIAL WATER 21:05 SATURDAY, MARCH 4, 1978 12

SPECIES=2

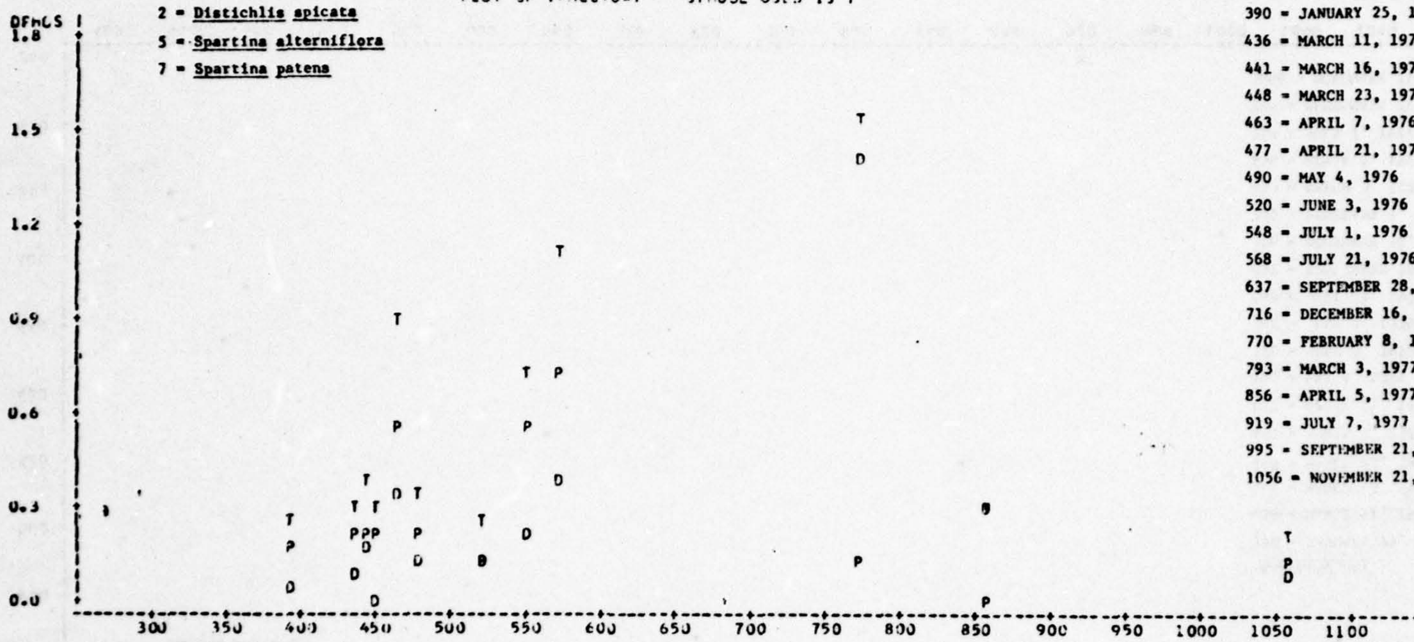
SPECIES OF PLANTS

2 = *Distichlis spicata*

5 = *Spartina alterniflora*

7 = *Spartina patens*

PLOT OF DPHOS*DAY SYMBOL USED IS D
PLOT OF PPHOS*DAY SYMBOL USED IS P
PLOT OF TPHOS*DAY SYMBOL USED IS T



SAMPLING DAY

SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16, 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
490 = MAY 4, 1976
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716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3, 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

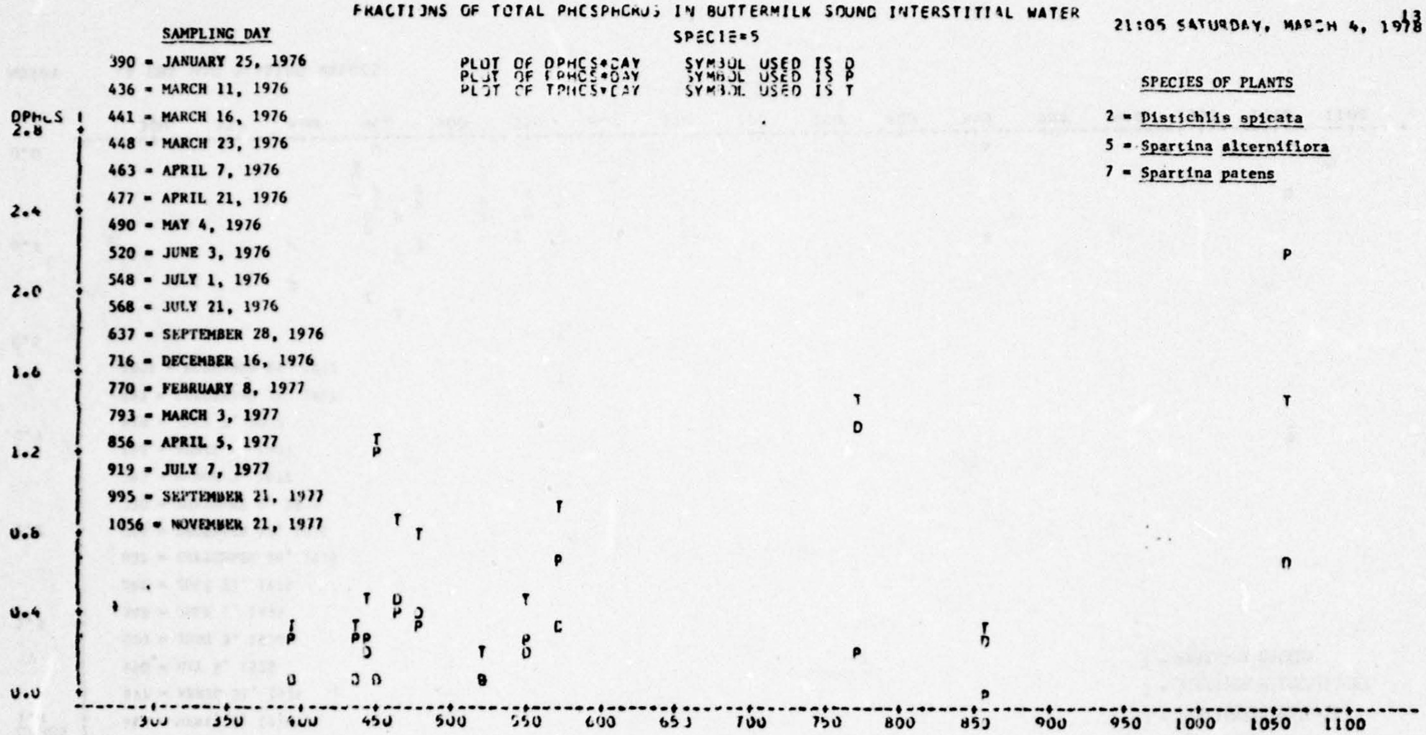
NOTE: 15 OBS HAD MISSING VALUES

B324

FRACTIONS OF TOTAL PHOSPHORUS IN BUTTERMILK SOUND INTERSTITIAL WATER   21:05 SATURDAY, MARCH 4, 1978 13

SPECIE=5

PLOT OF DPHOS*DAY   SYMBOL USED IS D
PLOT OF PPHOS*DAY   SYMBOL USED IS P
PLOT OF TPHOS*DAY   SYMBOL USED IS T



SPECIES OF PLANTS

2 = *Distichlis spicata*

5 = *Spartina alterniflora*

7 = *Spartina patens*

NOTE: 18 OBS HAD MISSING VALUES

B325

FRACTIONS OF TOTAL PHOSPHORUS IN BUTTERMILK SOUND INTERSTITIAL WATER

21:05 SATURDAY, MARCH 4, 1978 14

SPECIE=7

PLOT OF DPHOS*DAY   SYMBOL USED IS D
PLOT OF PPHOS*DAY   SYMBOL USED IS P
PLOT OF TPHOS*DAY   SYMBOL USED IS T

SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16, 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
490 = MAY 4, 1976
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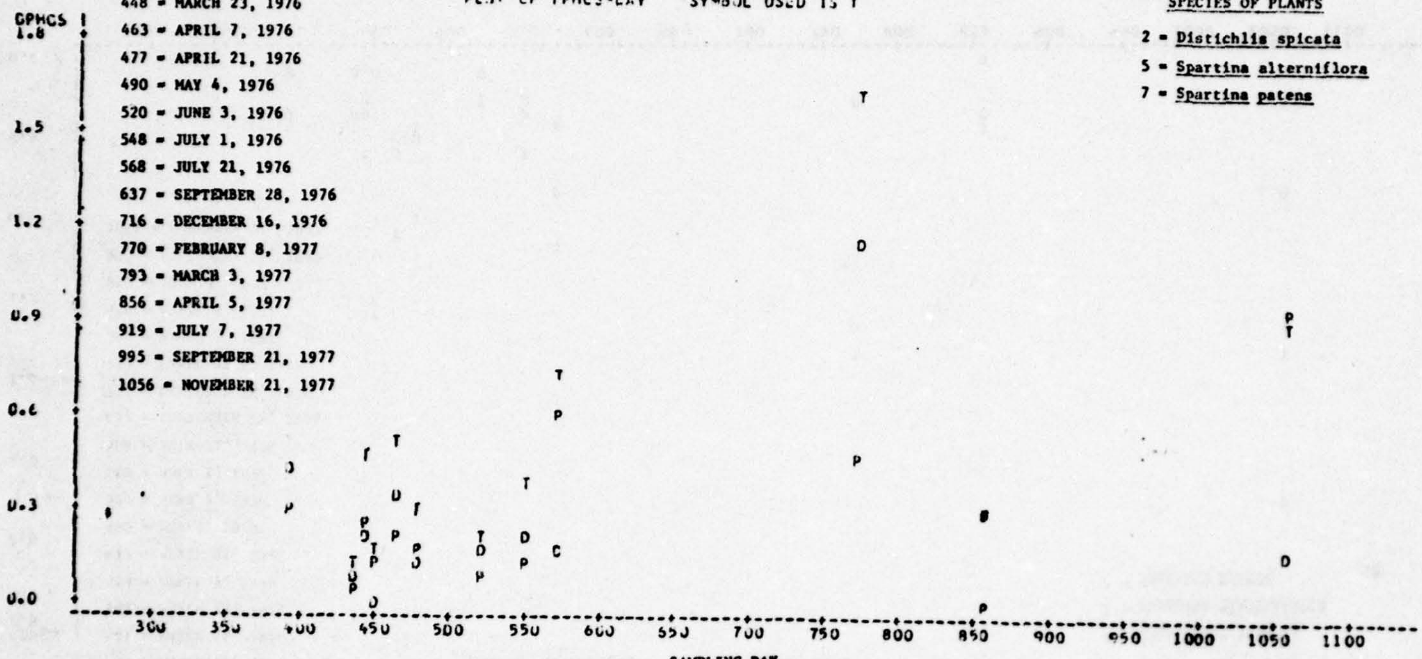
770 = FEBRUARY 8, 1977
793 = MARCH 3, 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

SPECIES OF PLANTS

2 = *Distichlis spicata*
5 = *Spartina alterniflora*
7 = *Spartina patens*



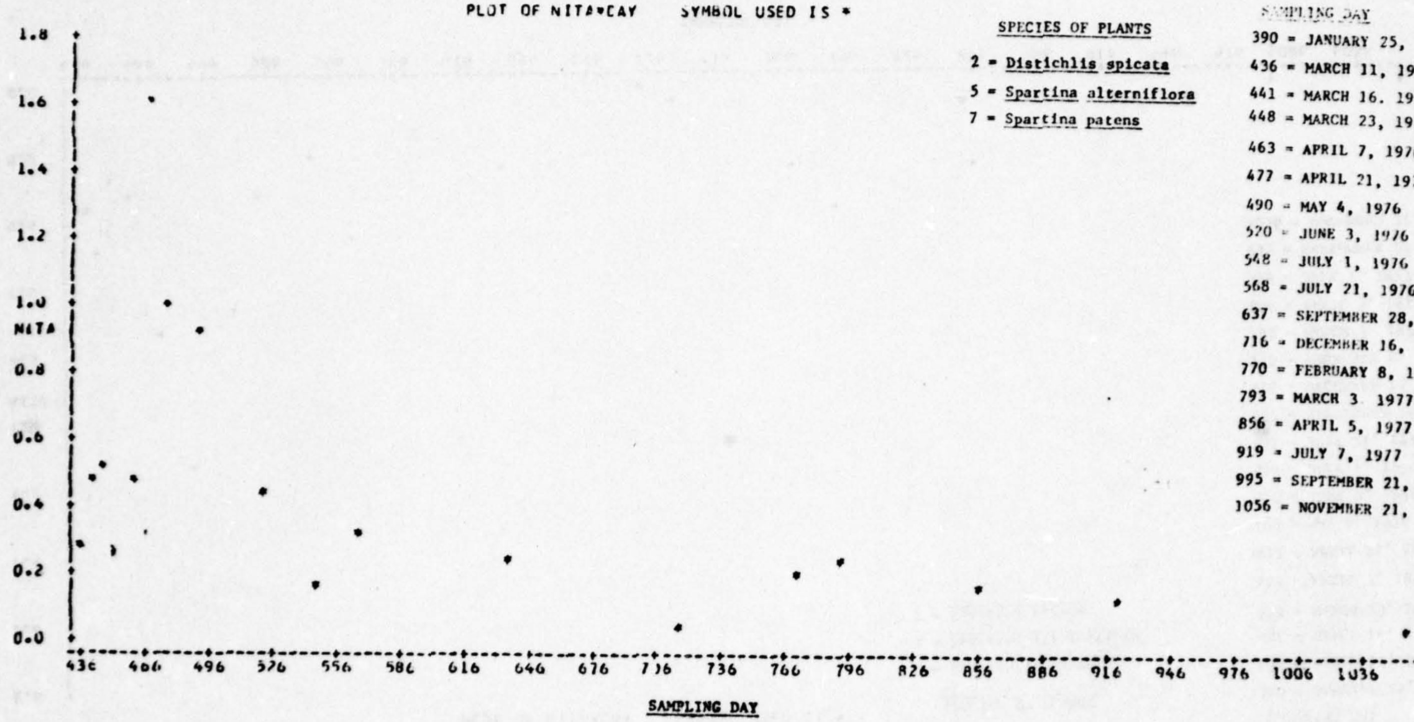
NOTE: 15 OBS HAD MISSING VALUES

B326

NITRATE AND NITRITE OF INTERSTITIAL WATER SAMPLES FROM BUTTERMILK SOUND 20:39 SATURDAY, MARCH 4, 1978

SPECIE=2

PLOT OF NITA*DAY SYMBOL USED IS *



SPECIES OF PLANTS

2 = *Distichlis spicata*
5 = *Spartina alterniflora*
7 = *Spartina patens*

SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16. 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
490 = MAY 4, 1976
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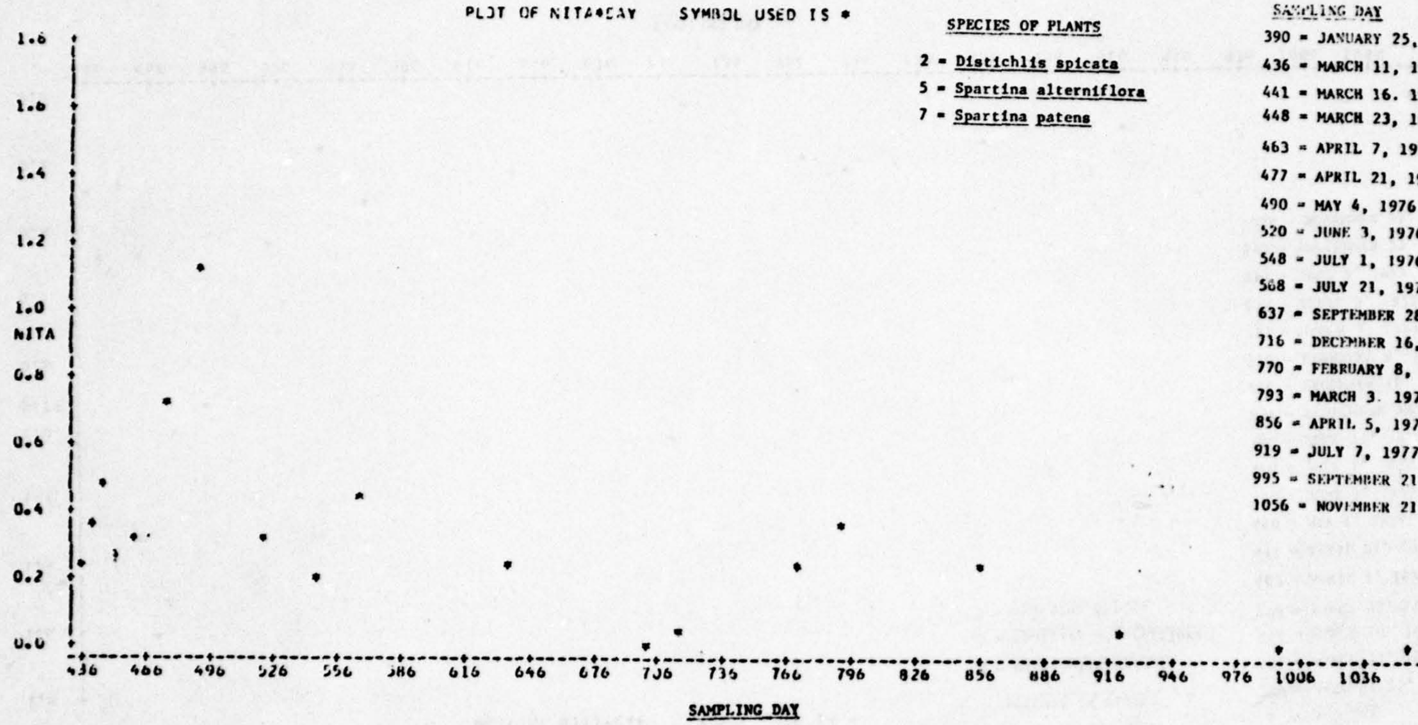
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

NITRATE AND NITRITE OF INTERSTITIAL WATER SAMPLES FROM BUTTERMILK SOUND 20:39 SATURDAY, MARCH 4, 1978

SPECIE=5

PLOT OF NITA*DAY SYMBOL USED IS *



SPECIES OF PLANTS

2 = *Distichlis spicata*
5 = *Spartina alterniflora*
7 = *Spartina patens*

SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16, 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
490 = MAY 4, 1976
520 = JUNE 3, 1976
548 = JULY 1, 1976
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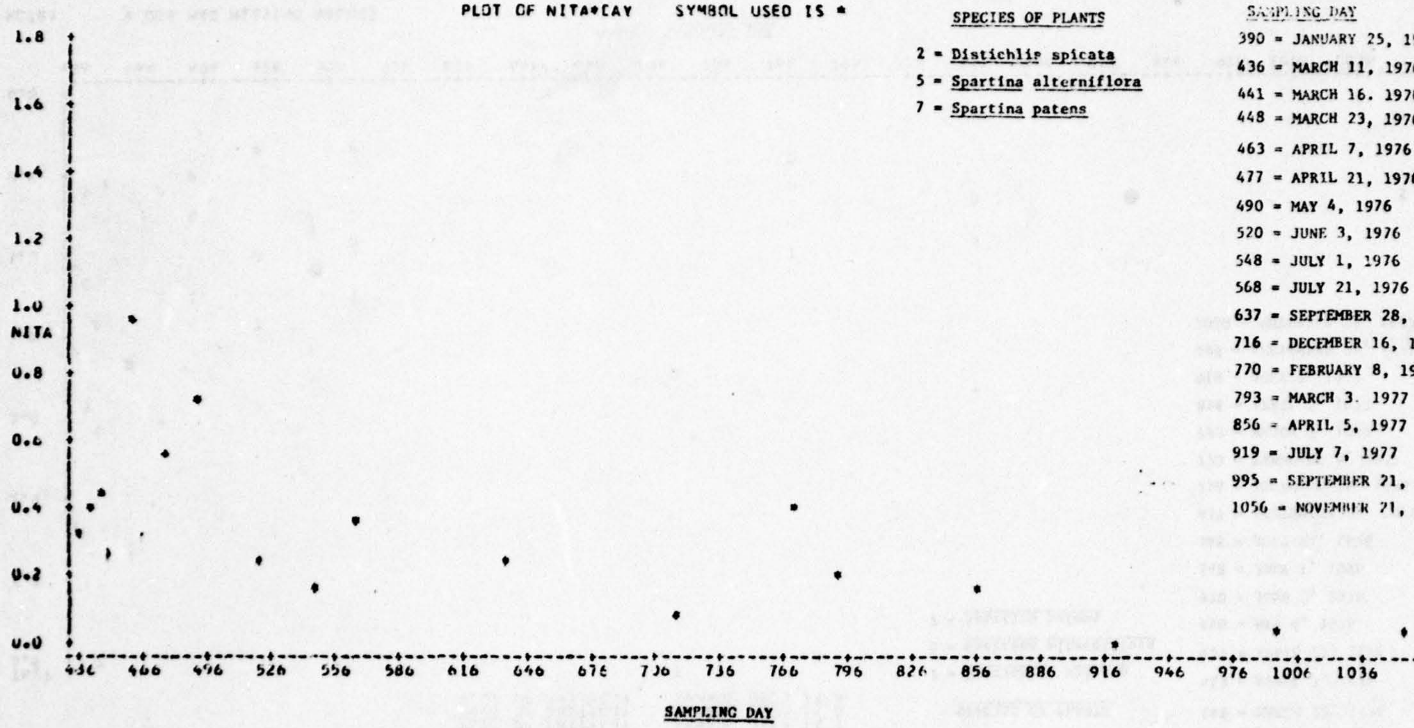
637 = SEPTEMBER 28, 1976
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3, 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

B328

NITRATE AND NITRITE OF INTERSTITIAL WATER SAMPLES FROM BUTTERMILK SOUND   20:39 SATURDAY, MARCH 4, 1978   4

SPECIE=7

PLOT OF NITA*DAY   SYMBOL USED IS *



SPECIES OF PLANTS

2 = *Distichlis spicata*
5 = *Spartina alterniflora*
7 = *Spartina patens*

SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
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448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
490 = MAY 4, 1976
520 = JUNE 3, 1976
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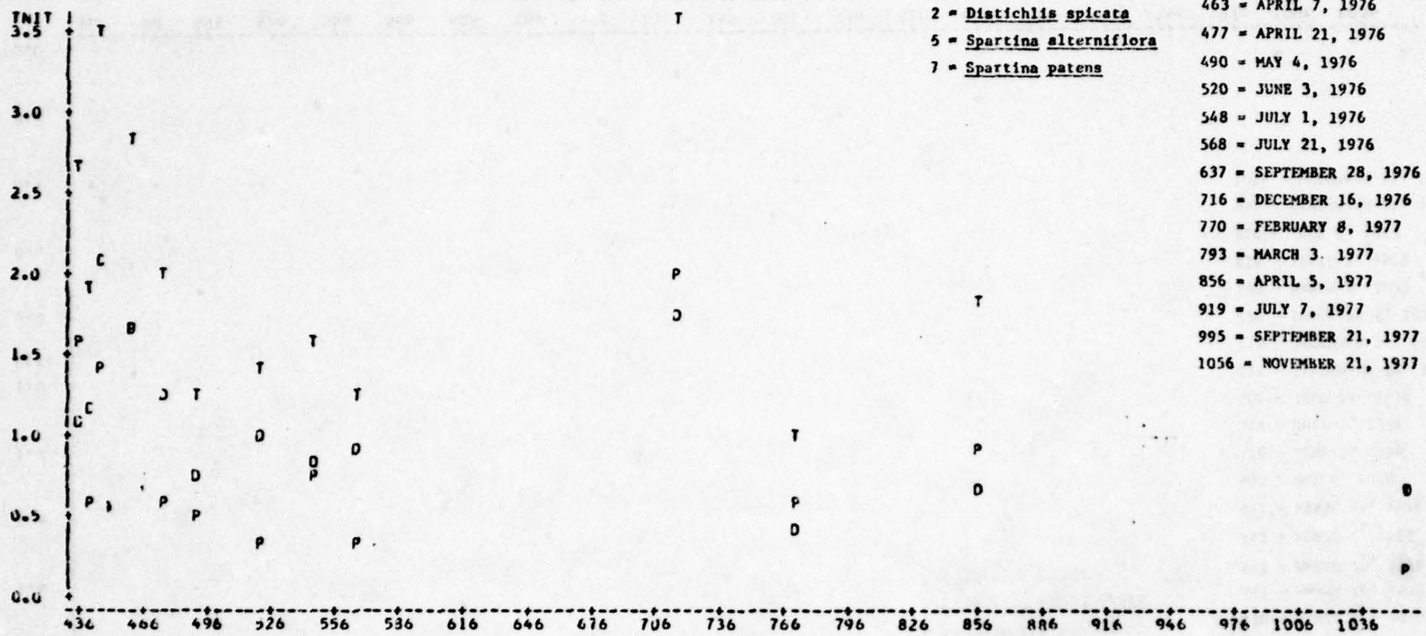
637 = SEPTEMBER 28, 1976
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3. 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

B329

FRACTION OF TOTAL NITROGEN IN BUTTERMILK SOUND INTERSTITIAL WATER 20:39

SPECIE=2

PLOT OF TNIT*DAY SYMBOL USED IS T
PLOT OF DNIT*DAY SYMBOL USED IS D
PLOT OF PNIT*DAY SYMBOL USED IS P



NOTE: 9 OBS HAD MISSING VALUES

SPECIES OF PLANTS

2 = *Distichlis spicata*

5 = *Spartina alterniflora*

7 = *Spartina patens*

SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16, 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
490 = MAY 4, 1976
520 = JUNE 3, 1976
548 = JULY 1, 1976
568 = JULY 21, 1976
637 = SEPTEMBER 28, 1976
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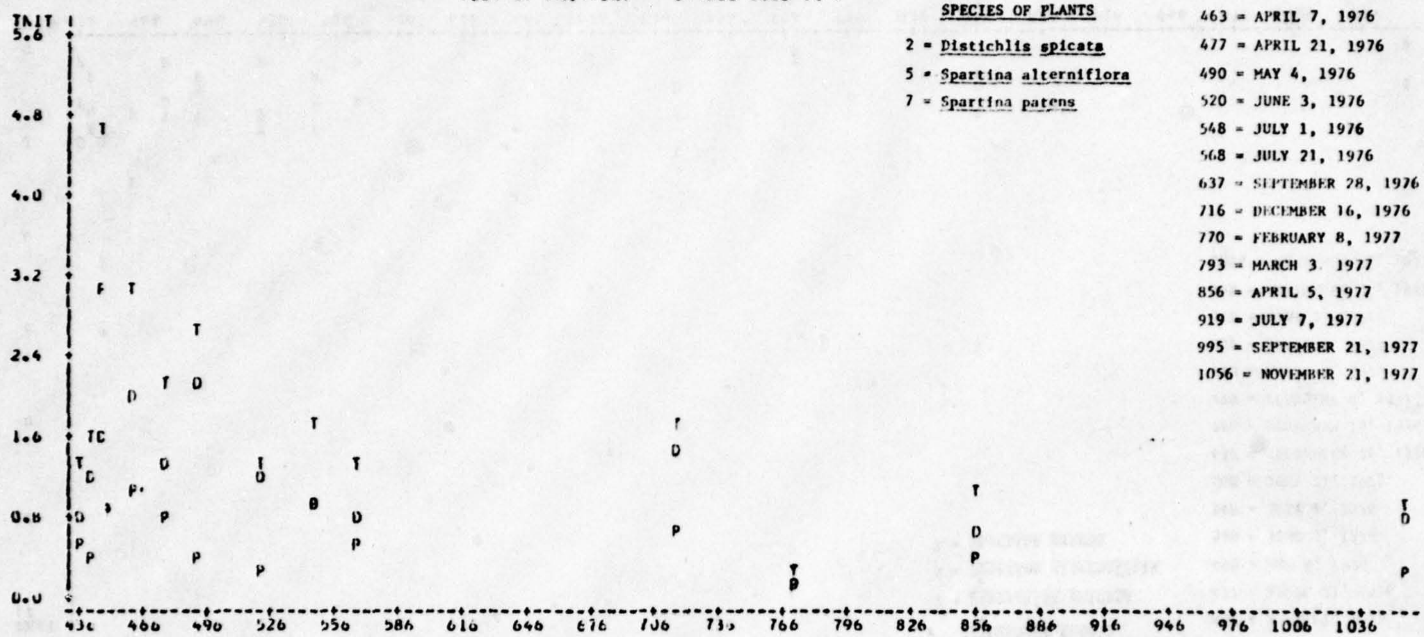
770 = FEBRUARY 8, 1977
793 = MARCH 3, 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

FRACTION OF TOTAL NITROGEN IN BUTTERMILK SOUND INTERSTITIAL WATER 20:39

SPECIE=5

PLOT OF TNIT*DAY SYMBOL USED IS T
PLOT OF DNIT*DAY SYMBOL USED IS D
PLOT OF PNIT*DAY SYMBOL USED IS P



NOTE: 15 OBS HAD MISSING VALUES

SPECIES OF PLANTS

2 = *Distichlis spicata*

5 = *Spartina alterniflora*

7 = *Spartina patens*

SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
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477 = APRIL 21, 1976
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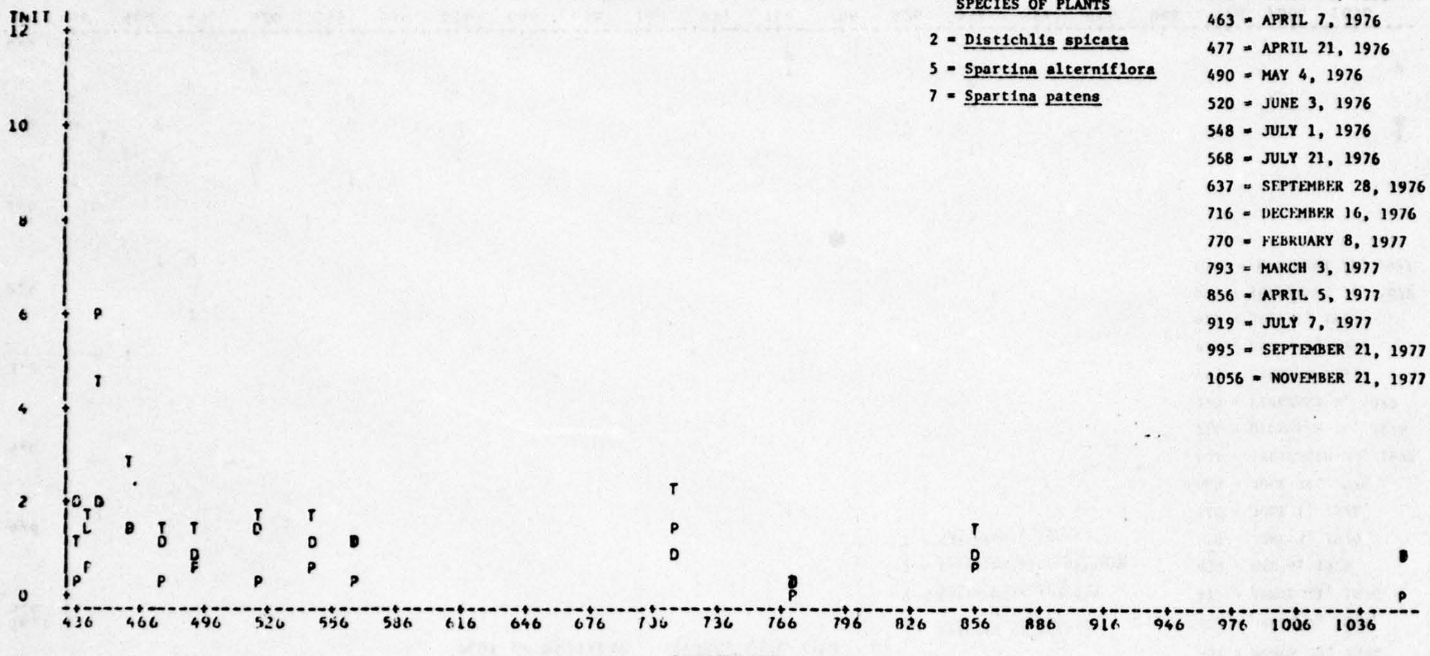
637 = SEPTEMBER 28, 1976
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

FRACTION OF TOTAL NITROGEN IN BUTTERMILK SOUND INTERSTITIAL WATER 20:39

SPECIE=7

PLOT OF TNIT*DAY SYMBOL USED IS T
PLOT OF DNIT*DAY SYMBOL USED IS D
PLOT OF PNIT*DAY SYMBOL USED IS P



NOTE: 12 OBS HAD MISSING VALUES

SPECIES OF PLANTS

2 = *Distichlis spicata*

5 = *Spartina alterniflora*

7 = *Spartina patens*

SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16, 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
490 = MAY 4, 1976
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548 = JULY 1, 1976
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637 = SEPTEMBER 28, 1976
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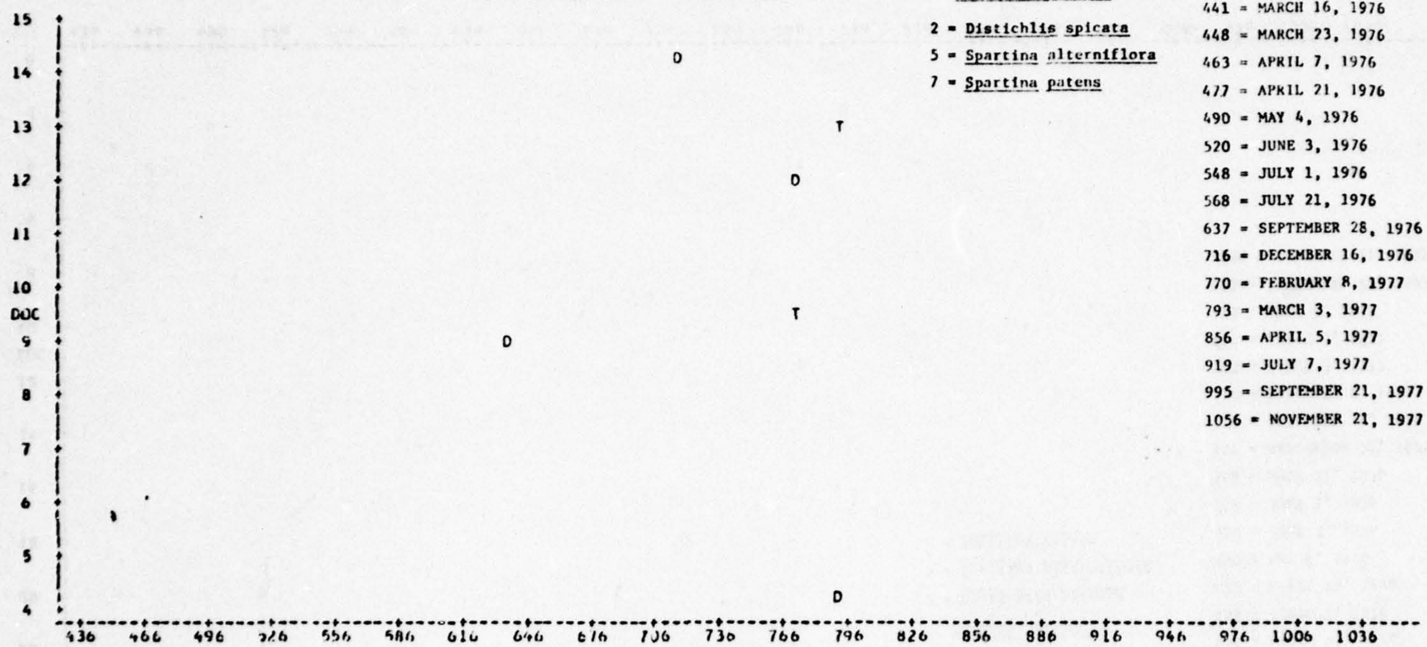
770 = FEBRUARY 8, 1977
793 = MARCH 3, 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

TOTAL AND DISSOLVED ORGANIC CARBON FROM BUTTERMILK SOUND INTERSTITIAL WATER 20:39

SPECIE=2

PLOT OF DOC*DAY SYMBOL USED IS D
PLOT OF TOC*DAY SYMBOL USED IS T



NOTE: 26 OBS HAD MISSING VALUES

SPECIES OF PLANTS

2 = *Distichlis spicata*
5 = *Spartina alterniflora*
7 = *Spartina patens*

SAMPLING DAY

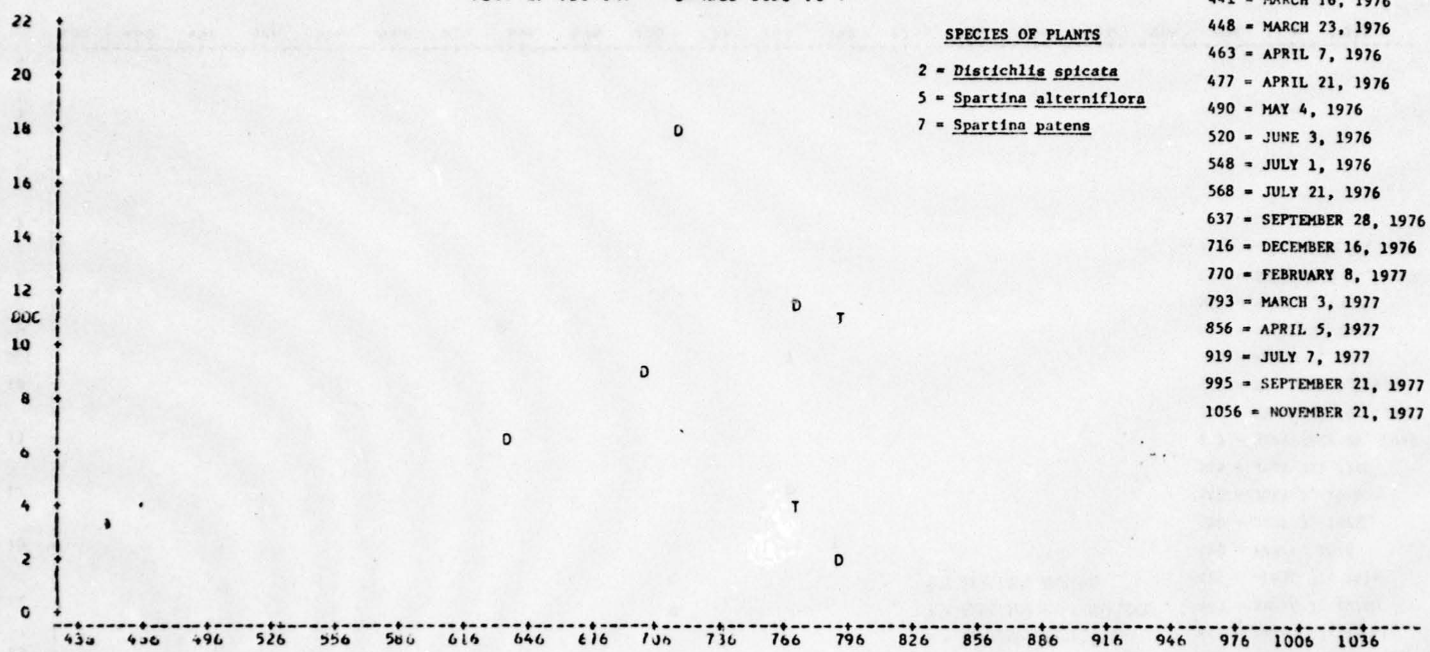
390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16, 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
490 = MAY 4, 1976
520 = JUNE 3, 1976
548 = JULY 1, 1976
568 = JULY 21, 1976
637 = SEPTEMBER 28, 1976
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3, 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

B333

TOTAL AND DISSOLVED ORGANIC CARBON FROM BUTTERMILK SOUND INTERSTITIAL WATER 20:39

SPECIE=5

PLOT OF DOC*DAY SYMBOL USED IS D
PLOT OF TOC*DAY SYMBOL USED IS T



NOTE: 29 OBS HAD MISSING VALUES

SPECIES OF PLANTS

2 = *Distichlis spicata*
5 = *Spartina alterniflora*
7 = *Spartina patens*

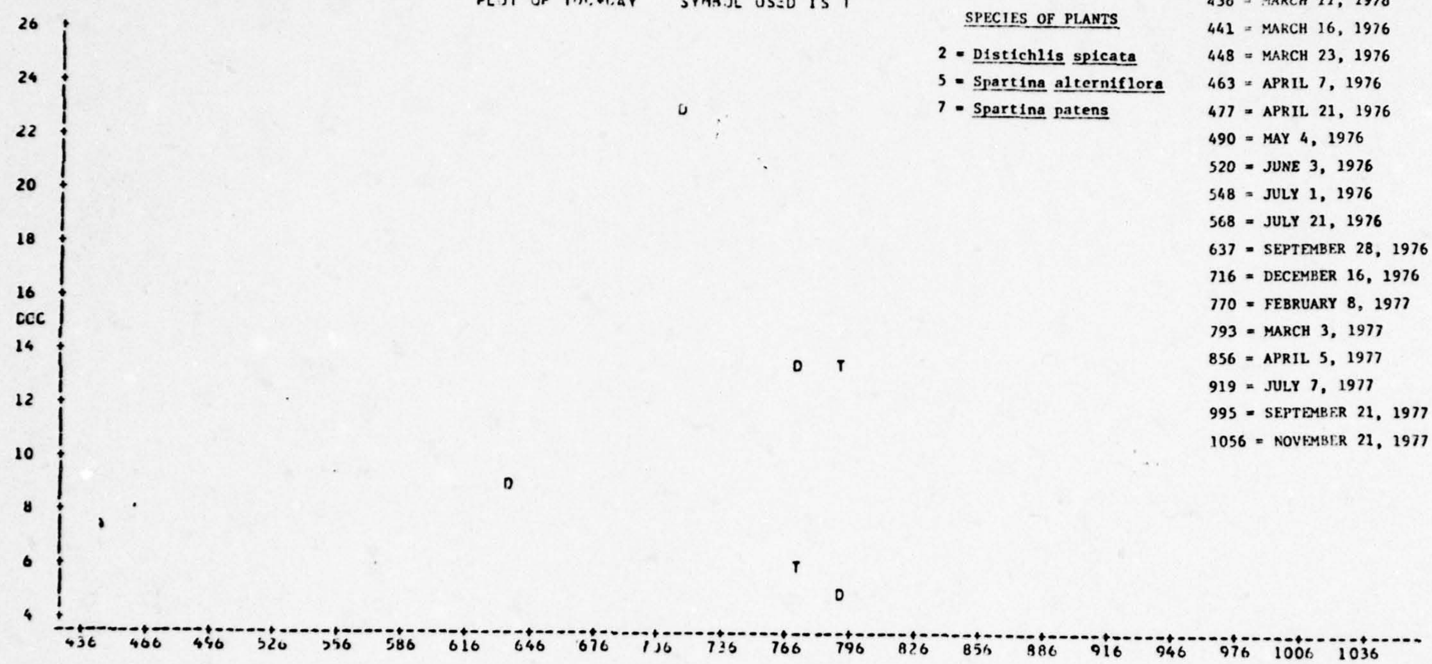
SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16, 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
490 = MAY 4, 1976
520 = JUNE 3, 1976
548 = JULY 1, 1976
568 = JULY 21, 1976
637 = SEPTEMBER 28, 1976
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3, 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

TOTAL AND DISSOLVED ORGANIC CARBON FROM BUTTERMILK SOUND INTERSTITIAL WATER 20:39

SPECIE=7

PLOT OF DOC*DAY SYMBOL USED IS D
PLOT OF TOC*DAY SYMBOL USED IS T



SAMPLING DAY

NOTE: 28 OBS HAD MISSING VALUES

SPECIES OF PLANTS

2 = *Distichlis spicata*
5 = *Spartina alterniflora*
7 = *Spartina patens*

SAMPLING DAY

390 = JANUARY 25, 1976
436 = MARCH 11, 1976
441 = MARCH 16, 1976
448 = MARCH 23, 1976
463 = APRIL 7, 1976
477 = APRIL 21, 1976
490 = MAY 4, 1976
520 = JUNE 3, 1976
548 = JULY 1, 1976
568 = JULY 21, 1976
637 = SEPTEMBER 28, 1976
716 = DECEMBER 16, 1976
770 = FEBRUARY 8, 1977
793 = MARCH 3, 1977
856 = APRIL 5, 1977
919 = JULY 7, 1977
995 = SEPTEMBER 21, 1977
1056 = NOVEMBER 21, 1977

APPENDIX C

BUTTERMILK SOUND PLANTS AND MACROINVERTEBRATES

Parts 1-4

Analysis of Variance

Legend for Dependent Variable Codes

stem_den	=	Stems /m^2.
Crab_b	=	Crab burrows /m^2
Elev	=	Elevation (m) above mean low water.
Air_b	=	Aerial biomass gdw/m^2.
Rt_bio	=	Root biomass gdw/m^2.
Cond	=	Condition index.
Basal_ar	=	Basal area cm^2/m^2.
Shoot_Ht	=	Average Shoot Height cm.
Fl_Stm	=	Flowering stems /m^2.
Survival	=	Percent survival of original sprigs.

Legend for Class Variable Codes

Species

1	=	*Borrichia frutescens*
2	=	*Distichlis spicata*
3	=	*Iva frutescens*
4	=	*Juncus roemerianus*
5	=	*Spartina alterniflora*
6	=	*Spartina cynosuroides*
7	=	*Spartina patens*
8	=	No plant (control)

Zone

1	=	Lower third of intertidal zone.
2	=	Middle third of intertidal zone.
3	=	Upper third of intertidal zone.

Fert = Fertilizer treatment

1 = No fertilizer.

2 = Inorganic 122 g/m^2.

3 = Inorganic 244 g/m^2.

4 = Organic 34 g/m^2.

5 = Organic 67 g/m^2.

Prop = Propagule type

1 = Sprigs

2 = Seeds

Rep = Replicate

Season

Spring = January through June.

Fall = July through December.

PART 1

Analysis of Variance

ANOVA

Stem and Crab burrow density

PART 2

Analysis of Variance

General Linear Model

All dependent variables for sprigged

propagules over entire 2½ year experimental period.

PART 3

Analysis of Variance

General Linear Model

Root and Aerial Biomass for seeded

propagules over last 1½ years of experiment.

PART 4

Analysis of Variance

ANOVA

Stem density, crab density, crab burrow density, Aerial biomass and Root biomass for the November 1977 sampling period.

PART 1

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

SEASON=FALL

MEANS

SPECIES	FERT	ZONE	YEAR	N	STEM_DEN
1	1	1	75	3	0.00000
1	1	1	76	3	0.00000
1	1	1	77	3	0.00000
1	1	2	75	3	5.33333
1	1	2	76	3	0.00000
1	1	2	77	3	28.33333
1	1	3	75	3	5.22222
1	1	3	76	3	56.83333
1	1	3	77	3	78.88889
1	2	1	75	3	0.00000
1	2	1	76	3	0.00000
1	2	1	77	3	0.00000
1	2	2	75	3	5.11111
1	2	2	76	3	1.33333
1	2	2	77	3	31.33333
1	2	3	75	3	5.33333
1	2	3	76	3	53.33333
1	2	3	77	3	67.77778
1	3	1	75	3	0.33333
1	3	1	76	3	0.00000
1	3	1	77	3	0.00000
1	3	2	75	3	4.66667
1	3	2	76	3	0.00000
1	3	2	77	3	54.00000
1	3	3	75	3	5.77778
1	3	3	76	3	89.16667
1	3	3	77	3	221.66667
1	4	1	75	3	0.66667
1	4	1	76	3	0.00000
1	4	1	77	3	0.00000
1	4	2	75	3	5.33333
1	4	2	76	3	0.00000
1	4	2	77	3	111.83333
1	4	3	75	3	4.44444
1	4	3	76	3	0.50000
1	4	3	77	3	25.77778
1	5	1	75	3	0.00000
1	5	1	76	3	0.00000
1	5	1	77	3	0.00000
1	5	2	75	3	5.83333
1	5	2	76	3	0.00000
1	5	2	77	3	0.00000
1	5	3	75	3	12.77778
1	5	3	76	3	122.16667
1	5	3	77	3	72.77778
2	1	1	75	3	0.33333
2	1	1	76	3	0.00000
2	1	1	77	3	0.00000
2	1	2	75	3	4.27778
2	1	2	76	3	0.00000
2	1	2	77	3	0.00000
2	1	3	75	3	14.44444
2	1	3	76	3	1518.83333
2	1	3	77	3	1746.66667

STATISTICAL ANALYSIS SYSTEM

SEASON=FALL

MEANS

SPECIES	FERT	ZONE	YEAR	N	STEM_DEN
2	2	1	75	3	1.00000
2	2	1	76	3	0.00000
2	2	1	77	3	0.00000
2	2	2	75	3	2.16667
2	2	2	76	3	1.33333
2	2	2	77	3	20.00000
2	2	3	75	3	20.55556
2	2	3	76	3	2066.66667
2	2	3	77	3	1458.88889
2	3	1	75	3	0.33333
2	3	1	76	3	0.00000
2	3	1	77	3	0.00000
2	3	2	75	3	6.33333
2	3	2	76	3	72.00000
2	3	2	77	3	79.00000
2	3	3	75	3	11.50000
2	3	3	76	3	1133.33333
2	3	3	77	3	468.88889
2	4	1	75	3	0.00000
2	4	1	76	3	0.00000
2	4	1	77	3	0.00000
2	4	2	75	3	5.77778
2	4	2	76	3	133.33333
2	4	2	77	3	21.22222
2	4	3	75	3	33.77778
2	4	3	76	3	2050.00000
2	4	3	77	3	1480.00000
2	5	1	75	3	0.33333
2	5	1	76	3	0.00000
2	5	1	77	3	0.00000
2	5	2	75	3	5.33333
2	5	2	76	3	0.00000
2	5	2	77	3	75.00000
2	5	3	75	3	22.22222
2	5	3	76	3	2266.66667
2	5	3	77	3	1240.00000
3	1	1	75	3	0.00000
3	1	1	76	3	0.00000
3	1	1	77	3	0.00000
3	1	2	75	3	3.00000
3	1	2	76	3	0.00000
3	1	2	77	3	21.11111
3	1	3	75	3	2.38889
3	1	3	76	3	0.16667
3	1	3	77	3	39.55556
3	2	1	75	3	0.00000
3	2	1	76	3	0.00000
3	2	1	77	3	0.00000
3	2	2	75	3	0.83333
3	2	2	76	3	0.00000
3	2	2	77	3	33.33333
3	2	3	75	3	1.33333
3	2	3	76	3	0.00000
3	2	3	77	3	0.00000

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

SEASON=FALL

MEANS

SPECIES	FERT	ZONE	YEAR	N	STEM_DEN
3	3	1	75	3	0.00000
3	3	1	76	3	0.00000
3	3	1	77	3	0.00000
3	3	2	75	3	2.66667
3	3	2	76	3	0.00000
3	3	2	77	3	163.33333
3	3	3	75	3	2.05556
3	3	3	76	3	283.33333
3	3	3	77	3	0.00000
3	4	1	75	3	0.00000
3	4	1	76	3	0.00000
3	4	1	77	3	0.00000
3	4	2	75	3	1.33333
3	4	2	76	3	15.00000
3	4	2	77	3	0.00000
3	4	3	75	3	3.33333
3	4	3	76	3	0.16667
3	4	3	77	3	0.11111
3	5	1	75	3	0.00000
3	5	1	76	3	0.00000
3	5	1	77	3	0.00000
3	5	2	75	3	5.16667
3	5	2	76	3	0.00000
3	5	2	77	3	140.00000
3	5	3	75	3	2.44444
3	5	3	76	3	0.50000
3	5	3	77	3	318.66667
4	1	1	75	3	3.83333
4	1	1	76	3	0.00000
4	1	1	77	3	0.00000
4	1	2	75	3	4.33333
4	1	2	76	3	0.00000
4	1	2	77	3	56.66667
4	1	3	75	3	7.44444
4	1	3	76	3	1981.66667
4	1	3	77	3	691.11111
4	2	1	75	3	2.11111
4	2	1	76	3	0.00000
4	2	1	77	3	0.00000
4	2	2	75	3	4.88889
4	2	2	76	3	0.00000
4	2	2	77	3	0.00000
4	2	3	75	3	5.00000
4	2	3	76	3	4.00000
4	2	3	77	3	485.00000
4	3	1	75	3	1.83333
4	3	1	76	3	0.00000
4	3	1	77	3	0.00000
4	3	2	75	3	6.16667
4	3	2	76	3	0.00000
4	3	2	77	3	0.00000
4	3	3	75	3	4.61111
4	3	3	76	3	23.00000
4	3	3	77	3	344.44444

STATISTICAL ANALYSIS SYSTEM

SEASON=FALL

MEANS

SPECIES	FERT	ZONE	YEAR	N	STEM_DEN
4	4	1	75	3	2.66667
4	4	1	76	3	3.00000
4	4	1	77	3	0.00000
4	4	2	75	3	2.61111
4	4	2	76	3	0.33333
4	4	2	77	3	41.55556
4	4	3	75	3	5.38889
4	4	3	76	3	1453.66667
4	4	3	77	3	1287.77778
4	5	1	75	3	1.00000
4	5	1	76	3	0.00000
4	5	1	77	3	0.00000
4	5	2	75	3	4.33333
4	5	2	76	3	3.00000
4	5	2	77	3	28.33333
4	5	3	75	3	11.55556
4	5	3	76	3	1306.66667
4	5	3	77	3	922.22222
5	1	1	75	3	7.22222
5	1	1	76	3	220.00000
5	1	1	77	3	212.22222
5	1	2	75	3	14.19444
5	1	2	76	3	30.33333
5	1	2	77	3	65.55556
5	1	3	75	3	7.11111
5	1	3	76	3	67.33333
5	1	3	77	3	2.22222
5	2	1	75	3	6.77778
5	2	1	76	3	223.33333
5	2	1	77	3	185.55556
5	2	2	75	3	11.05556
5	2	2	76	3	145.83333
5	2	2	77	3	208.88889
5	2	3	75	3	9.33333
5	2	3	76	3	17.16667
5	2	3	77	3	45.55556
5	3	1	75	3	3.66667
5	3	1	76	3	0.00000
5	3	1	77	3	0.00000
5	3	2	75	3	35.38889
5	3	2	76	3	168.66667
5	3	2	77	3	337.22222
5	3	3	75	3	7.77778
5	3	3	76	3	1.33333
5	3	3	77	3	5.77778
5	4	1	75	3	0.66667
5	4	1	76	3	0.00000
5	4	1	77	3	0.00000
5	4	2	75	3	16.94444
5	4	2	76	3	68.00000
5	4	2	77	3	131.11111
5	4	3	75	3	15.44444
5	4	3	76	3	52.66667
5	4	3	77	3	41.11111

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

SEASON=FALL

MEANS

SPECIES	FERT	ZONE	YEAR	N	STEM_DEN
5	5	1	75	3	3.833333
5	5	1	76	3	1.666667
5	5	1	77	3	10.000000
5	5	2	75	3	15.000000
5	5	2	76	3	66.666667
5	5	2	77	3	171.722222
5	5	3	75	3	12.111111
5	5	3	76	3	71.166667
5	5	3	77	3	33.277778
6	1	1	75	3	2.000000
6	1	1	76	3	0.000000
6	1	1	77	3	0.000000
6	1	2	75	3	4.944444
6	1	2	76	3	0.333333
6	1	2	77	3	33.333333
6	1	3	75	3	5.222222
6	1	3	76	3	2.666667
6	1	3	77	3	75.333333
6	2	1	75	3	0.000000
6	2	1	76	3	0.000000
6	2	1	77	3	0.000000
6	2	2	75	3	3.111111
6	2	2	76	3	0.000000
6	2	2	77	3	13.333333
6	2	3	75	3	6.333333
6	2	3	76	3	214.000000
6	2	3	77	3	21.111111
6	3	1	75	3	1.000000
6	3	1	76	3	0.000000
6	3	1	77	3	0.000000
6	3	2	75	3	2.111111
6	3	2	76	3	0.833333
6	3	2	77	3	3.333333
6	3	3	75	3	7.000000
6	3	3	76	3	66.500000
6	3	3	77	3	32.222222
6	4	1	75	3	0.666667
6	4	1	76	3	0.000000
6	4	1	77	3	0.000000
6	4	2	75	3	3.500000
6	4	2	76	3	0.000000
6	4	2	77	3	40.000000
6	4	3	75	3	4.666667
6	4	3	76	3	68.333333
6	4	3	77	3	169.111111
6	5	1	75	3	2.000000
6	5	1	76	3	0.000000
6	5	1	77	3	0.000000
6	5	2	75	3	3.000000
6	5	2	76	3	0.666667
6	5	2	77	3	17.777778
6	5	3	75	3	6.333333
6	5	3	76	3	168.333333
6	5	3	77	3	35.555556

STATISTICAL ANALYSIS SYSTEM

SEASON=FALL

MEANS

SPECIES	FERT	ZONE	YEAR	N	STEM_DEN
7	1	1	75	3	3.00000
7	1	1	76	3	0.00000
7	1	1	77	3	0.00000
7	1	2	75	3	7.66667
7	1	2	76	3	0.00000
7	1	2	77	3	0.00000
7	1	3	75	3	21.44444
7	1	3	76	3	1126.50000
7	1	3	77	3	911.11111
7	2	1	75	3	2.66667
7	2	1	76	3	0.00000
7	2	1	77	3	0.00000
7	2	2	75	3	6.44444
7	2	2	76	3	0.00000
7	2	2	77	3	18.33333
7	2	3	75	3	16.33333
7	2	3	76	3	3016.83333
7	2	3	77	3	2340.00000
7	3	1	75	3	2.83333
7	3	1	76	3	0.00000
7	3	1	77	3	0.00000
7	3	2	75	3	3.00000
7	3	2	76	3	0.00000
7	3	2	77	3	40.00000
7	3	3	75	3	33.88889
7	3	3	76	3	5506.66667
7	3	3	77	3	1707.77778
7	4	1	75	3	1.66667
7	4	1	76	3	0.00000
7	4	1	77	3	0.00000
7	4	2	75	3	7.72222
7	4	2	76	3	0.33333
7	4	2	77	3	0.00000
7	4	3	75	3	36.33333
7	4	3	76	3	4933.33333
7	4	3	77	3	3283.33333
7	5	1	75	3	1.33333
7	5	1	76	3	0.00000
7	5	1	77	3	0.00000
7	5	2	75	3	5.88889
7	5	2	76	3	0.00000
7	5	2	77	3	0.00000
7	5	3	75	3	36.44444
7	5	3	76	3	2334.16667
7	5	3	77	3	1754.44444
8	1	1	75	3	0.00000
8	1	1	76	3	0.00000
8	1	1	77	3	0.00000
8	1	2	75	3	0.00000
8	1	2	76	3	0.00000
8	1	2	77	3	46.66667
8	1	3	75	3	0.00000
8	1	3	76	3	0.00000
8	1	3	77	3	0.00000

STATISTICAL ANALYSIS SYSTEM

SEASON=FALL

MEANS

SPECIES	FERT	ZONE	YEAR	N	STEM_DEN
8	2	1	75	3	0.000000
8	2	1	76	3	0.000000
8	2	1	77	3	0.000000
8	2	2	75	3	0.000000
8	2	2	76	3	0.000000
8	2	2	77	3	21.666667
8	2	3	75	3	0.000000
8	2	3	76	3	0.000000
8	2	3	77	3	0.000000
8	3	1	75	3	0.000000
8	3	1	76	3	0.000000
8	3	1	77	3	8.333333
8	3	2	75	3	0.000000
8	3	2	76	3	0.000000
8	3	2	77	3	0.000000
8	3	3	75	3	0.000000
8	3	3	76	3	733.333333
8	3	3	77	3	31.111111
8	4	1	75	3	0.000000
8	4	1	76	3	0.000000
8	4	1	77	3	0.000000
8	4	2	75	3	0.000000
8	4	2	76	3	0.000000
8	4	2	77	3	0.000000
8	4	3	75	3	0.000000
8	4	3	76	3	0.000000
8	4	3	77	3	0.000000
8	5	1	75	3	0.000000
8	5	1	76	3	0.000000
8	5	1	77	3	0.000000
8	5	2	75	3	0.000000
8	5	2	76	3	0.000000
8	5	2	77	3	21.111111
8	5	3	75	3	0.000000
8	5	3	76	3	20.000000
8	5	3	77	3	0.000000

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

SEASON=FALL

MEANS

FERT	ZONE	YEAR	N	STEM_DEN
1	1	75	24	2.04861
1	1	76	24	27.50000
1	1	77	24	26.52778
1	2	75	24	5.46875
1	2	76	24	3.83333
1	2	77	24	31.45833
1	3	75	24	7.90972
1	3	76	24	594.25000
1	3	77	24	443.11111
2	1	75	24	1.56944
2	1	76	24	27.91667
2	1	77	24	23.19444
2	2	75	24	4.20139
2	2	76	24	18.56250
2	2	77	24	43.36111
2	3	75	24	8.32778
2	3	76	24	671.50000
2	3	77	24	514.79167
3	1	75	24	1.25000
3	1	76	24	0.00000
3	1	77	24	1.04167
3	2	75	24	7.54167
3	2	76	24	30.18750
3	2	77	24	84.61111
3	3	75	24	9.07639
3	3	76	24	979.20833
3	3	77	24	351.48611
4	1	75	24	0.79167
4	1	76	24	0.00000
4	1	77	24	0.00000
4	2	75	24	5.40278
4	2	76	24	27.12500
4	2	77	24	43.21528
4	3	75	24	12.88194
4	3	76	24	1069.83333
4	3	77	24	785.90278
5	1	75	24	1.06250
5	1	76	24	3.20833
5	1	77	24	1.25000
5	2	75	24	5.56944
5	2	76	24	8.41667
5	2	77	24	56.74306
5	3	75	24	12.98611
5	3	76	24	786.20833
5	3	77	24	547.11806

C12

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

SEASON=FALL

MEANS

SPECIES	ZONE	YEAR	N	STEM_DEN
1	1	75	15	0.20000
1	1	76	15	0.00000
1	1	77	15	0.00000
1	2	75	15	5.25556
1	2	76	15	0.26667
1	2	77	15	45.10000
1	3	75	15	6.71111
1	3	76	15	64.40000
1	3	77	15	93.37778
2	1	75	15	0.40000
2	1	76	15	0.00000
2	1	77	15	0.00000
2	2	75	15	4.77778
2	2	76	15	41.33333
2	2	77	15	39.04444
2	3	75	15	20.50000
2	3	76	15	1807.10000
2	3	77	15	1278.88889
3	1	75	15	0.00000
3	1	76	15	0.00000
3	1	77	15	0.00000
3	2	75	15	2.60000
3	2	76	15	3.00000
3	2	77	15	71.55556
3	3	75	15	2.24444
3	3	76	15	56.83333
3	3	77	15	71.66667
4	1	75	15	2.28889
4	1	76	15	0.00000
4	1	77	15	3.00000
4	2	75	15	4.46667
4	2	76	15	0.06667
4	2	77	15	25.31111
4	3	75	15	6.80000
4	3	76	15	953.20000
4	3	77	15	746.11111
5	1	75	15	4.43333
5	1	76	15	85.00000
5	1	77	15	81.55556
5	2	75	15	18.51667
5	2	76	15	95.90000
5	2	77	15	182.90000
5	3	75	15	10.35556
5	3	76	15	41.93333
5	3	77	15	25.58889
6	1	75	15	1.13333
6	1	76	15	0.00000
6	1	77	15	0.00000
6	2	75	15	3.33333
6	2	76	15	0.36667
6	2	77	15	21.55556
6	3	75	15	5.91111
6	3	76	15	103.96667
6	3	77	15	66.66667

STATISTICAL ANALYSIS SYSTEM

SEASON=FALL

MEANS

SPECIES	ZONE	YEAR	N	STEM_DEN
7	1	75	15	2.30000
7	1	76	15	0.00000
7	1	77	15	3.00000
7	2	75	15	6.14444
7	2	76	15	0.06667
7	2	77	15	11.66667
7	3	75	15	28.88889
7	3	76	15	3483.50000
7	3	77	15	1939.33333
8	1	75	15	0.00000
8	1	76	15	0.00000
8	1	77	15	1.66667
8	2	75	15	0.00000
8	2	76	15	0.00000
8	2	77	15	17.88889
8	3	75	15	0.00000
8	3	76	15	150.66667
8	3	77	15	6.22222

ZONE	YEAR	N	STEM_DEN
1	75	120	1.34444
1	76	120	11.12500
1	77	120	15.43278
2	75	120	5.63681
2	76	120	17.62500
2	77	120	51.87778
3	75	120	10.17639
3	76	120	820.23000
3	77	120	528.48194

STATISTICAL ANALYSIS SYSTEM

SEASON=FALL

MEANS

SPECIES	FERT	YEAR	N	STEM_DEN
1	1	75	9	3.518519
1	1	76	9	18.944444
1	1	77	9	35.743741
1	2	75	9	3.481481
1	2	76	9	18.222222
1	2	77	9	33.037037
1	3	75	9	3.592593
1	3	76	9	29.722222
1	3	77	9	91.888889
1	4	75	9	3.481481
1	4	76	9	0.166667
1	4	77	9	45.870370
1	5	75	9	6.203704
1	5	76	9	40.722222
1	5	77	9	24.259259
2	1	75	9	6.351852
2	1	76	9	506.277778
2	1	77	9	582.222222
2	2	75	9	7.907407
2	2	76	9	689.333333
2	2	77	9	492.962963
2	3	75	9	6.055556
2	3	76	9	401.777778
2	3	77	9	182.629630
2	4	75	9	13.185185
2	4	76	9	727.777778
2	4	77	9	500.407407
2	5	75	9	9.296296
2	5	76	9	755.555556
2	5	77	9	438.333333
3	1	75	9	1.796296
3	1	76	9	0.055556
3	1	77	9	20.222222
3	2	75	9	0.722222
3	2	76	9	0.000000
3	2	77	9	11.111111
3	3	75	9	1.574074
3	3	76	9	94.444444
3	3	77	9	54.444444
3	4	75	9	1.444444
3	4	76	9	5.055556
3	4	77	9	0.037037
3	5	75	9	2.537037
3	5	76	9	0.166667
3	5	77	9	152.888889
4	1	75	9	5.203704
4	1	76	9	460.555556
4	1	77	9	249.259259
4	2	75	9	4.000000
4	2	76	9	1.333333
4	2	77	9	161.666667
4	3	75	9	4.203704
4	3	76	9	6.666667
4	3	77	9	114.814815

STATISTICAL ANALYSIS SYSTEM

SEASON=FALL

MEANS

SPECIES	FERT	YEAR	N	STEM_DEN
4	4	75	9	3.55556
4	4	76	9	484.66667
4	4	77	9	443.11111
4	5	75	9	5.62963
4	5	76	9	435.55556
4	5	77	9	316.85185
5	1	75	9	9.50926
5	1	76	9	105.68889
5	1	77	9	93.33333
5	2	75	9	9.05556
5	2	76	9	128.77778
5	2	77	9	146.66667
5	3	75	9	15.61111
5	3	76	9	56.66667
5	3	77	9	114.33333
5	4	75	9	11.01852
5	4	76	9	40.22222
5	4	77	9	57.40741
5	5	75	9	10.31481
5	5	76	9	46.50000
5	5	77	9	71.66667
6	1	75	9	4.05556
6	1	76	9	1.00000
6	1	77	9	36.22222
6	2	75	9	3.14815
6	2	76	9	71.33333
6	2	77	9	11.48148
6	3	75	9	3.37037
6	3	76	9	22.44444
6	3	77	9	11.85185
6	4	75	9	2.94444
6	4	76	9	22.77778
6	4	77	9	69.70370
6	5	75	9	3.77778
6	5	76	9	56.33333
6	5	77	9	17.77778
7	1	75	9	10.70370
7	1	76	9	375.50000
7	1	77	9	303.70370
7	2	75	9	8.48148
7	2	76	9	1005.61111
7	2	77	9	686.11111
7	3	75	9	13.24074
7	3	76	9	1835.55556
7	3	77	9	582.59259
7	4	75	9	15.24074
7	4	76	9	1644.55556
7	4	77	9	1094.44444
7	5	75	9	14.55556
7	5	76	9	778.05556
7	5	77	9	584.81481
8	1	75	9	0.00000
8	1	76	9	0.00000
8	1	77	9	15.55556

STATISTICAL ANALYSIS SYSTEM

SEASON=FALL

MEANS

SPECIES	FERT	YEAR	N	STEM_DEN
8	2	75	9	0.00000
8	2	76	9	0.00000
8	2	77	9	7.22222
8	3	75	9	0.00000
8	3	76	9	244.44444
8	3	77	9	13.14815
8	4	75	9	0.00000
8	4	76	9	0.00000
8	4	77	9	0.00000
8	5	75	9	0.00000
8	5	76	9	6.66667
8	5	77	9	7.03704

FERT	YEAR	N	STEM_DEN
1	75	72	5.14236
1	76	72	208.52778
1	77	72	167.03241
2	75	72	4.59954
2	76	72	239.32639
2	77	72	193.78241
3	75	72	5.95602
3	76	72	336.46528
3	77	72	145.71296
4	75	72	6.35880
4	76	72	365.65278
4	77	72	276.37269
5	75	72	6.53935
5	76	72	264.94444
5	77	72	201.70370

STATISTICAL ANALYSIS SYSTEM

SEASON=FALL

MEANS

SPECIES	YEAR	N	STEM_DEN
1	75	45	4.05556
1	76	45	21.55556
1	77	45	46.15926
2	75	45	8.55926
2	76	45	616.14444
2	77	45	439.31111
3	75	45	1.61481
3	76	45	19.94444
3	77	45	47.74074
4	75	45	4.51852
4	76	45	317.75556
4	77	45	257.14074
5	75	45	11.10185
5	76	45	75.61111
5	77	45	96.68148
6	75	45	3.45926
6	76	45	34.77778
6	77	45	29.40741
7	75	45	12.44444
7	76	45	1127.85556
7	77	45	650.33333
8	75	45	0.00000
8	76	45	50.22222
8	77	45	8.59259

YEAR		N	STEM_DEN
75		360	5.71921
76		360	282.98333
77		360	196.92083

C18

STATISTICAL ANALYSIS SYSTEM

SEASON=FALL

MEANS

SPECIES	FERT	ZONE	N	STEM_DEN
1	1	1	9	0.00000
1	1	2	9	11.22222
1	1	3	9	46.96148
1	2	1	9	0.00000
1	2	2	9	12.59259
1	2	3	9	42.14815
1	3	1	9	0.11111
1	3	2	9	19.55556
1	3	3	9	105.53704
1	4	1	9	0.22222
1	4	2	9	39.05556
1	4	3	9	10.24074
1	5	1	9	0.00000
1	5	2	9	1.94444
1	5	3	9	69.24074
2	1	1	9	0.11111
2	1	2	9	1.42593
2	1	3	9	1093.31481
2	2	1	9	0.33333
2	2	2	9	7.83333
2	2	3	9	1182.03704
2	3	1	9	0.11111
2	3	2	9	52.44444
2	3	3	9	537.90741
2	4	1	9	0.00000
2	4	2	9	53.44444
2	4	3	9	1187.92593
2	5	1	9	0.11111
2	5	2	9	26.77778
2	5	3	9	1176.29630
3	1	1	9	0.00000
3	1	2	9	8.03704
3	1	3	9	14.03704
3	2	1	9	0.00000
3	2	2	9	11.38889
3	2	3	9	3.44444
3	3	1	9	0.00000
3	3	2	9	55.33333
3	3	3	9	95.12963
3	4	1	9	0.00000
3	4	2	9	5.44444
3	4	3	9	1.09259
3	5	1	9	0.00000
3	5	2	9	48.38889
3	5	3	9	107.20370
4	1	1	9	1.27778
4	1	2	9	23.33333
4	1	3	9	893.40741
4	2	1	9	3.70370
4	2	2	9	1.62963
4	2	3	9	164.66667
4	3	1	9	3.61111
4	3	2	9	2.05556
4	3	3	9	123.01852

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

SEASON=FALL

MEANS

SPECIES	FERT	ZONE	N	STEM_DEN
4	4	1	9	0.88889
4	4	2	9	14.83333
4	4	3	9	915.61111
4	5	1	9	0.33333
4	5	2	9	13.88889
4	5	3	9	746.81481
5	1	1	9	146.48148
5	1	2	9	36.69444
5	1	3	9	25.55556
5	2	1	9	138.55556
5	2	2	9	121.92593
5	2	3	9	24.01852
5	3	1	9	1.22222
5	3	2	9	180.42593
5	3	3	9	4.96296
5	4	1	9	0.22222
5	4	2	9	72.01852
5	4	3	9	36.40741
5	5	1	9	5.16667
5	5	2	9	84.46296
5	5	3	9	38.85185
6	1	1	9	0.66667
6	1	2	9	12.87037
6	1	3	9	27.74074
6	2	1	9	0.00000
6	2	2	9	5.48148
6	2	3	9	80.48148
6	3	1	9	0.33333
6	3	2	9	2.09259
6	3	3	9	35.24074
6	4	1	9	0.22222
6	4	2	9	14.50000
6	4	3	9	80.70370
6	5	1	9	0.66667
6	5	2	9	7.14815
6	5	3	9	70.07407
7	1	1	9	1.00000
7	1	2	9	2.55556
7	1	3	9	696.35185
7	2	1	9	0.88889
7	2	2	9	8.25926
7	2	3	9	1691.05556
7	3	1	9	0.94444
7	3	2	9	14.33333
7	3	3	9	2416.11111
7	4	1	9	0.55556
7	4	2	9	2.68519
7	4	3	9	2751.00000
7	5	1	9	0.44444
7	5	2	9	1.46296
7	5	3	9	1375.31852
8	1	1	9	0.00000
8	1	2	9	15.55556
8	1	3	9	0.00000

C20

STATISTICAL ANALYSIS SYSTEM

SEASON=FALL

MEANS

SPECIES	FERT	ZONE	N	STEM_DEN
8	2	1	9	0.00000
8	2	2	9	7.22222
8	2	3	9	0.00000
8	3	1	9	2.77778
8	3	2	9	0.00000
8	3	3	9	254.81481
8	4	1	9	0.00000
8	4	2	9	0.00000
8	4	3	9	0.00000
8	5	1	9	0.00000
8	5	2	9	7.03704
8	5	3	9	6.66667

FERT	ZONE	N	STEM_DEN
1	1	72	18.69213
1	2	72	13.58681
1	3	72	348.42361
2	1	72	17.55019
2	2	72	22.04167
2	3	72	398.10648
3	1	72	0.76389
3	2	72	40.78009
3	3	72	446.59028
4	1	72	0.26389
4	2	72	25.24769
4	3	72	622.87269
5	1	72	0.84028
5	2	72	23.57639
5	3	72	448.77083

STATISTICAL ANALYSIS SYSTEM

SEASON=FALL

225,47

MEANS

SPECIES	ZONE	N	STEM_DEN
1	1	45	0.06667
1	2	45	16.87407
1	3	45	54.82963
2	1	45	0.13333
2	2	45	28.38519
2	3	45	1035.49630
3	1	45	0.00000
3	2	45	25.71852
3	3	45	43.58148
4	1	45	0.76296
4	2	45	9.94815
4	3	45	568.70370
5	1	45	58.32963
5	2	45	99.10556
5	3	45	25.95926
6	1	45	0.37778
6	2	45	8.41852
6	3	45	58.84815
7	1	45	0.76667
7	2	45	5.95926
7	3	45	1783.90741
8	1	45	0.55556
8	2	45	5.96296
8	3	45	52.29630

ZONE	N	STEM_DEN
1	360	7.62407
2	360	25.04653
3	360	452.95278

C22

STATISTICAL ANALYSIS SYSTEM

SEASON=FALL

MEANS

250
211.28

SPECIES	FERT	N	STEM_DEN
1	1	27	19.401235
1	2	27	18.246914
1	3	27	41.734568
1	4	27	16.506173
1	5	27	23.720395
2	1	27	364.950617
2	2	27	396.734568
2	3	27	196.820988
2	4	27	413.790123
2	5	27	401.061728
3	1	27	7.358025
3	2	27	3.944444
3	3	27	50.154321
3	4	27	2.179012
3	5	27	51.864198
4	1	27	305.006173
4	2	27	55.666667
4	3	27	41.395062
4	4	27	310.444444
4	5	27	252.679012
5	1	27	69.577160
5	2	27	94.833333
5	3	27	62.203704
5	4	27	36.216049
5	5	27	42.827160
6	1	27	13.759259
6	2	27	28.654321
6	3	27	12.555556
6	4	27	31.808642
6	5	27	25.962963
7	1	27	229.969136
7	2	27	566.734568
7	3	27	810.462963
7	4	27	918.080247
7	5	27	459.141975
8	1	27	5.185185
8	2	27	2.407407
8	3	27	85.364198
8	4	27	0.000000
8	5	27	4.567901

FERT	N	STEM_DEN
1	216	126.900849
2	216	145.902778
3	216	162.711420
4	216	216.128086
5	216	157.729167

C23

STATISTICAL ANALYSIS SYSTEM

150
130.17

SEASON=FALL

MEANS

SPECIES	N	STEM_DEN
1	135	23.923457
2	135	354.671605
3	135	23.100000
4	135	193.138272
5	135	61.131481
6	135	22.548148
7	135	596.877778
8	135	19.604938
OVERALL MEANS	1080	161.874460

C24

STATISTICAL ANALYSIS SYSTEM

SEASON=FALL

ANALYSIS OF VARIANCE FOR VARIABLE STEM_DEN MEAN 161.874460 C.V. 263.473200 %

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	LSD .01	LSD .05	DIVISOR
REP	2	1321637	660818.7			
ZONE	2	45806995	22903497.3			
ERROR A	4	1782750	445687.6	229.099063	138.153534	360
YEAR	2	14500825	7250412.4			
ZONE*YEAR	4	26039645	6509911.4			
ERROR B	12	2893889	241157.4			
SPECIES	7	42587973	6083996.2			
FERT	4	958951	239737.8			
SPECIES*FERT	28	10336242	369151.5			
SPECIES*ZONE	14	90530350	6466453.6			
FERT*ZONE	8	2181962	272745.2			
SPECIES*FERT*ZONE	56	20388500	364080.4			
ERROR C	234	68956446	294665.7			
SPECIES*YEAR	14	25316977	1808355.5			
FERT*YEAR	8	1009034	126129.3			
SPECIES*FERT*YEAR	56	10205993	182249.9			

C25

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

SEASON=FALL

ANALYSIS OF VARIANCE FOR VARIABLE STEM_DEN   MEAN 161.874460   C.V. 260.473200 %

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	LSD .01	LSD .05	DIVISOR
SPECIES*ZONE*YEAR	28	52542727	1876526.0			
FERT*ZONE*YEAR	16	2358216	147388.5			
SPECIES*FERT*ZONE*YEAR	112	20511241	183136.1			
ERROR D	468	83201012	177779.9			
LSD_SPECIES	234	68956446	294685.7	171.591507	130.176407	135
LSD_FERT	234	68956446	294685.7	135.655014	102.913483	216
LSD_SP*F	234	68956446	294685.7	383.690186	291.083252	27
LSD_SP*Z	234	68956446	294665.7	297.205078	225.472183	45
LSD_SP*Y	468	83201012	177779.9	229.899185	174.674240	45
RESIDUAL	468	83201012	177779.9			
CORRECTED TOTAL	1079	523431366	485107.8			

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB > F
NUMERATOR:	YEAR	2	14500825	7250412.4	30.06506	0.0001
DENOMINATOR:	ERROR B	12	2893889	241157.4		
NUMERATOR:	ZONE*YEAR	4	26039645	6509911.4	26.99445	0.0001
DENOMINATOR:	ERROR B	12	2893889	241157.4		
NUMERATOR:	SPECIES	7	42587973	6083996.2	20.64571	0.0001
DENOMINATOR:	ERROR C	234	68956446	294685.7		
NUMERATOR:	FERT	4	958951	239737.8	0.81354	0.5196
DENOMINATOR:	ERROR C	234	68956446	294685.7		

STATISTICAL ANALYSIS SYSTEM

SEASON=FALL

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB > F
NUMERATOR:	SPECIES*FERT	28	10336242	369151.5	1.25270	0.1861
DENOMINATOR:	ERROR C	234	68956446	294685.7		
NUMERATOR:	SPECIES*ZONE	14	90530350	6466453.6	21.94356	0.0001
DENOMINATOR:	ERROR C	234	68956446	294685.7		
NUMERATOR:	FERT*ZONE	8	2181962	272745.2	0.92555	0.5032
DENOMINATOR:	ERROR C	234	68956446	294685.7		
NUMERATOR:	SPECIES*FERT*ZONE	56	20388500	364080.4	1.23549	0.1430
DENOMINATOR:	ERROR C	234	68956446	294685.7		
NUMERATOR:	SPECIES*YEAR	14	25316977	1808355.5	10.17188	0.0001
DENOMINATOR:	ERROR D	468	83201012	177779.9		
NUMERATOR:	FERT*YEAR	8	1009034	126129.3	0.70947	0.6851
DENOMINATOR:	ERROR D	468	83201012	177779.9		
NUMERATOR:	SPECIES*FERT*YEAR	56	10205993	182249.9	1.02514	0.4300
DENOMINATOR:	ERROR D	468	83201012	177779.9		

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S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

SEASON=FALL

MEANS

SPECIES	FERT	ZONE	YEAR	N	CRAB_B
1	1	1	75	3	0.0000000
1	1	1	76	3	0.0000000
1	1	1	77	3	0.0000000
1	1	2	75	3	0.0000000
1	1	2	76	3	0.0000000
1	1	2	77	3	58.4000000
1	1	3	75	3	0.1111111
1	1	3	76	3	0.2444444
1	1	3	77	3	79.7444444
1	2	1	75	3	0.0000000
1	2	1	76	3	0.0000000
1	2	1	77	3	0.0000000
1	2	2	75	3	0.0000000
1	2	2	76	3	3.4777778
1	2	2	77	3	25.0000000
1	2	3	75	3	0.0000000
1	2	3	76	3	1.1777778
1	2	3	77	3	19.6666667
1	3	1	75	3	0.0000000
1	3	1	76	3	0.0000000
1	3	1	77	3	0.0000000
1	3	2	75	3	0.8888889
1	3	2	76	3	0.0000000
1	3	2	77	3	48.3333333
1	3	3	75	3	0.3333333
1	3	3	76	3	0.0000000
1	3	3	77	3	37.2222222
1	4	1	75	3	0.0000000
1	4	1	76	3	0.0000000
1	4	1	77	3	0.0000000
1	4	2	75	3	0.0000000
1	4	2	76	3	2.2222222
1	4	2	77	3	6.7333333
1	4	3	75	3	0.6666667
1	4	3	76	3	0.0777778
1	4	3	77	3	38.4444444
1	5	1	75	3	0.0000000
1	5	1	76	3	0.0000000
1	5	1	77	3	0.0000000
1	5	2	75	3	0.0000000
1	5	2	76	3	0.0000000
1	5	2	77	3	23.3333333
1	5	3	75	3	0.0000000
1	5	3	76	3	2.2888889
1	5	3	77	3	28.8888889
2	1	1	75	3	0.0000000
2	1	1	76	3	0.0000000
2	1	1	77	3	0.0000000
2	1	2	75	3	0.3333333
2	1	2	76	3	0.0000000
2	1	2	77	3	0.0000000
2	1	3	75	3	0.0000000
2	1	3	76	3	1.0666667
2	1	3	77	3	77.3333333

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

SEASON=FALL

MEANS

SPECIES	FERT	ZONE	YEAR	N	CRAB_B
2	2	1	75	3	0.000000
2	2	1	76	3	0.000000
2	2	1	77	3	0.000000
2	2	2	75	3	14.500000
2	2	2	76	3	1.333333
2	2	2	77	3	14.777778
2	2	3	75	3	0.000000
2	2	3	76	3	4.083333
2	2	3	77	3	99.333333
2	3	1	75	3	0.000000
2	3	1	76	3	0.000000
2	3	1	77	3	0.000000
2	3	2	75	3	0.444444
2	3	2	76	3	1.033333
2	3	2	77	3	22.400000
2	3	3	75	3	0.000000
2	3	3	76	3	0.666667
2	3	3	77	3	45.555556
2	4	1	75	3	0.000000
2	4	1	76	3	0.000000
2	4	1	77	3	0.000000
2	4	2	75	3	0.000000
2	4	2	75	3	1.800000
2	4	2	77	3	28.888889
2	4	3	75	3	0.000000
2	4	3	76	3	18.444444
2	4	3	77	3	40.000000
2	5	1	75	3	0.000000
2	5	1	76	3	0.000000
2	5	1	77	3	0.000000
2	5	2	75	3	0.000000
2	5	2	76	3	0.000000
2	5	2	77	3	40.216667
2	5	3	75	3	0.000000
2	5	3	76	3	16.711111
2	5	3	77	3	134.666667
3	1	1	75	3	0.000000
3	1	1	76	3	0.000000
3	1	1	77	3	0.000000
3	1	2	75	3	7.000000
3	1	2	76	3	0.000000
3	1	2	77	3	31.522222
3	1	3	75	3	0.111111
3	1	3	76	3	0.700000
3	1	3	77	3	40.355556
3	2	1	75	3	0.000000
3	2	1	76	3	0.000000
3	2	1	77	3	0.000000
3	2	2	75	3	0.633333
3	2	2	76	3	0.000000
3	2	2	77	3	6.666667
3	2	3	75	3	0.000000
3	2	3	76	3	0.000000
3	2	3	77	3	25.655556

STATISTICAL ANALYSIS SYSTEM

SEASON=FALL

MEANS

SPECIES	FERT	ZONE	YEAR	N	CRAB_B
3	3	1	75	3	0.0000000
3	3	1	76	3	3.3000000
3	3	1	77	3	0.0000000
3	3	2	75	3	0.0000000
3	3	2	76	3	0.0000000
3	3	2	77	3	30.0000000
3	3	3	75	3	0.0000000
3	3	3	76	3	0.1444444
3	3	3	77	3	47.7777778
3	4	1	75	3	0.0000000
3	4	1	76	3	0.0000000
3	4	1	77	3	0.0000000
3	4	2	75	3	0.0000000
3	4	2	76	3	0.0000000
3	4	2	77	3	33.3333333
3	4	3	75	3	0.0000000
3	4	3	76	3	0.0000000
3	4	3	77	3	45.3111111
3	5	1	75	3	0.0000000
3	5	1	76	3	0.0000000
3	5	1	77	3	0.0000000
3	5	2	75	3	0.0000000
3	5	2	76	3	0.0000000
3	5	2	77	3	0.0000000
3	5	3	75	3	0.0000000
3	5	3	76	3	0.2000000
3	5	3	77	3	33.7777778
4	1	1	75	3	0.0000000
4	1	1	76	3	0.0000000
4	1	1	77	3	0.0000000
4	1	2	75	3	2.6666667
4	1	2	76	3	0.0000000
4	1	2	77	3	15.0000000
4	1	3	75	3	0.2222222
4	1	3	76	3	1.1111111
4	1	3	77	3	50.3333333
4	2	1	75	3	0.0000000
4	2	1	76	3	0.0000000
4	2	1	77	3	0.0000000
4	2	2	75	3	0.0000000
4	2	2	76	3	0.0000000
4	2	2	77	3	14.3333333
4	2	3	75	3	0.0000000
4	2	3	76	3	0.0777778
4	2	3	77	3	8.8777778
4	3	1	75	3	0.0000000
4	3	1	76	3	0.0000000
4	3	1	77	3	0.0000000
4	3	2	75	3	2.0000000
4	3	2	76	3	0.0000000
4	3	2	77	3	0.0000000
4	3	3	75	3	4.8688889
4	3	3	76	3	3.7000000
4	3	3	77	3	56.6666667

STATISTICAL ANALYSIS SYSTEM

SEASON=FALL

MEANS

SPECIES	FERT	ZONE	YEAR	N	CRAB_B
4	4	1	75	3	0.0000000
4	4	1	76	3	0.0000000
4	4	1	77	3	0.0000000
4	4	2	75	3	0.0000000
4	4	2	76	3	0.0000000
4	4	2	77	3	14.9222222
4	4	3	75	3	0.0000000
4	4	3	76	3	0.2611111
4	4	3	77	3	38.1111111
4	5	1	75	3	0.0000000
4	5	1	76	3	0.0000000
4	5	1	77	3	0.0000000
4	5	2	75	3	0.0000000
4	5	2	76	3	0.0000000
4	5	2	77	3	15.4333333
4	5	3	75	3	0.0000000
4	5	3	76	3	0.1444444
4	5	3	77	3	37.8444444
5	1	1	75	3	0.0000000
5	1	1	76	3	0.0000000
5	1	1	77	3	1.1111111
5	1	2	75	3	0.0833333
5	1	2	76	3	0.8222222
5	1	2	77	3	33.8888889
5	1	3	75	3	0.0000000
5	1	3	76	3	0.1166667
5	1	3	77	3	27.7777778
5	2	1	75	3	0.0000000
5	2	1	76	3	0.0000000
5	2	1	77	3	4.4444444
5	2	2	75	3	0.0000000
5	2	2	76	3	0.0000000
5	2	2	77	3	14.6222222
5	2	3	75	3	0.1111111
5	2	3	76	3	2.7833333
5	2	3	77	3	37.3333333
5	3	1	75	3	0.0000000
5	3	1	76	3	0.0000000
5	3	1	77	3	0.0000000
5	3	2	75	3	0.0000000
5	3	2	76	3	8.3333333
5	3	2	77	3	27.4000000
5	3	3	75	3	0.0000000
5	3	3	76	3	0.0000000
5	3	3	77	3	0.8888889
5	4	1	75	3	0.0000000
5	4	1	76	3	0.0000000
5	4	1	77	3	0.0000000
5	4	2	75	3	0.8888889
5	4	2	76	3	0.4333333
5	4	2	77	3	28.9111111
5	4	3	75	3	0.3333333
5	4	3	76	3	4.7666667
5	4	3	77	3	35.5555556

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

SEASON=FALL

MEANS

SPECIES	FERT	ZONE	YEAR	N	CRAB_B
5	5	1	75	3	0.0000000
5	5	1	76	3	0.0000000
5	5	1	77	3	0.0000000
5	5	2	75	3	0.0000000
5	5	2	76	3	3.0000000
5	5	2	77	3	42.7777778
5	5	3	75	3	0.0000000
5	5	3	76	3	0.0000000
5	5	3	77	3	68.3333333
6	1	1	75	3	0.0000000
6	1	1	76	3	0.0000000
6	1	1	77	3	0.0000000
6	1	2	75	3	15.1666667
6	1	2	76	3	0.9166667
6	1	2	77	3	0.0000000
6	1	3	75	3	0.0000000
6	1	3	76	3	0.1500000
6	1	3	77	3	45.0000000
6	2	1	75	3	0.0000000
6	2	1	76	3	0.0000000
6	2	1	77	3	0.0000000
6	2	2	75	3	1.4444444
6	2	2	76	3	0.0000000
6	2	2	77	3	5.5777778
6	2	3	75	3	0.8888889
6	2	3	76	3	0.2666667
6	2	3	77	3	10.0000000
6	3	1	75	3	0.0000000
6	3	1	76	3	0.0000000
6	3	1	77	3	0.0000000
6	3	2	75	3	0.0000000
6	3	2	76	3	1.0111111
6	3	2	77	3	14.9666667
6	3	3	75	3	2.0000000
6	3	3	76	3	0.5833333
6	3	3	77	3	23.3333333
6	4	1	75	3	0.0000000
6	4	1	76	3	0.0000000
6	4	1	77	3	0.0000000
6	4	2	75	3	0.0000000
6	4	2	76	3	0.0000000
6	4	2	77	3	46.6666667
6	4	3	75	3	4.1111111
6	4	3	76	3	0.0000000
6	4	3	77	3	21.1111111
6	5	1	75	3	0.0000000
6	5	1	76	3	0.0000000
6	5	1	77	3	0.0000000
6	5	2	75	3	0.0000000
6	5	2	76	3	0.0000000
6	5	2	77	3	2.2222222
6	5	3	75	3	0.0000000
6	5	3	76	3	0.2611111
6	5	3	77	3	12.7444444

STATISTICAL ANALYSIS SYSTEM

SEASON=FALL

MEANS

SPECIES	FERT	ZONE	YEAR	N	CRAB_B
7	1	1	75	3	0.000000
7	1	1	76	3	0.000000
7	1	1	77	3	0.000000
7	1	2	75	3	0.000000
7	1	2	76	3	0.000000
7	1	2	77	3	15.400000
7	1	3	75	3	0.888889
7	1	3	76	3	1.138889
7	1	3	77	3	58.555556
7	2	1	75	3	0.000000
7	2	1	76	3	0.000000
7	2	1	77	3	0.000000
7	2	2	75	3	0.000000
7	2	2	76	3	0.000000
7	2	2	77	3	9.633333
7	2	3	75	3	0.111111
7	2	3	76	3	1.788889
7	2	3	77	3	56.666667
7	3	1	75	3	0.000000
7	3	1	76	3	0.000000
7	3	1	77	3	0.000000
7	3	2	75	3	2.500000
7	3	2	76	3	0.000000
7	3	2	77	3	6.666667
7	3	3	75	3	0.000000
7	3	3	76	3	16.666667
7	3	3	77	3	60.288889
7	4	1	75	3	0.000000
7	4	1	76	3	0.000000
7	4	1	77	3	0.000000
7	4	2	75	3	0.000000
7	4	2	76	3	0.611111
7	4	2	77	3	3.333333
7	4	3	75	3	0.000000
7	4	3	76	3	0.666667
7	4	3	77	3	128.688889
7	5	1	75	3	0.000000
7	5	1	76	3	0.000000
7	5	1	77	3	0.000000
7	5	2	75	3	0.000000
7	5	2	76	3	0.000000
7	5	2	77	3	4.000000
7	5	3	75	3	1.111111
7	5	3	76	3	4.066667
7	5	3	77	3	114.111111
8	1	1	75	3	0.000000
8	1	1	76	3	0.000000
8	1	1	77	3	0.000000
8	1	2	75	3	0.000000
8	1	2	76	3	0.000000
8	1	2	77	3	40.000000
8	1	3	75	3	0.000000
8	1	3	76	3	0.000000
8	1	3	77	3	30.477778

STATISTICAL ANALYSIS SYSTEM

SEASON=FALL

MEANS

SPECIES	FERT	ZONE	YEAR	N	CRAB_B
8	2	1	75	3	0.0000000
8	2	1	76	3	0.0000000
8	2	1	77	3	0.0000000
8	2	2	75	3	0.6666667
8	2	2	76	3	0.0000000
8	2	2	77	3	28.4000000
8	2	3	75	3	0.0000000
8	2	3	76	3	0.1666667
8	2	3	77	3	33.1444444
8	3	1	75	3	0.0000000
8	3	1	76	3	0.0000000
8	3	1	77	3	0.3030300
8	3	2	75	3	0.0000000
8	3	2	76	3	2.1666667
8	3	2	77	3	12.2222222
8	3	3	75	3	0.0000000
8	3	3	76	3	0.0000000
8	3	3	77	3	27.3083333
8	4	1	75	3	0.0000000
8	4	1	76	3	0.0000000
8	4	1	77	3	0.0000000
8	4	2	75	3	7.0000000
8	4	2	76	3	0.0777778
8	4	2	77	3	6.9555556
8	4	3	75	3	0.0000000
8	4	3	76	3	0.0000000
8	4	3	77	3	29.1111111
8	5	1	75	3	0.0000000
8	5	1	76	3	0.0000000
8	5	1	77	3	0.0000000
8	5	2	75	3	0.0000000
8	5	2	76	3	1.3333333
8	5	2	77	3	6.2888889
8	5	3	75	3	0.0000000
8	5	3	76	3	1.3666667
8	5	3	77	3	13.3333333

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STATISTICAL ANALYSIS SYSTEM

SEASON=FALL

MEANS

FERT	ZONE	YEAR	N	CRAB_B
1	1	75	24	0.0000000
1	1	76	24	0.0000000
1	1	77	24	0.1388889
1	2	75	24	3.1562500
1	2	76	24	0.2173611
1	2	77	24	24.2763889
1	3	75	24	0.1666667
1	3	76	24	0.5659722
1	3	77	24	51.1972222
2	1	75	24	0.0000000
2	1	76	24	0.0000000
2	1	77	24	0.5555556
2	2	75	24	2.1805556
2	2	76	24	0.6013889
2	2	77	24	14.8763889
2	3	75	24	0.1388889
2	3	76	24	1.2430556
2	3	77	24	36.3347222
3	1	75	24	0.0000000
3	1	76	24	0.0000000
3	1	77	24	0.0000000
3	2	75	24	0.7291667
3	2	76	24	1.5580556
3	2	77	24	20.2486111
3	3	75	24	0.9027778
3	3	76	24	2.7201389
3	3	77	24	38.3802083
4	1	75	24	0.0000000
4	1	76	24	0.0000000
4	1	77	24	0.0000000
4	2	75	24	0.9861111
4	2	76	24	0.6430556
4	2	77	24	21.2180556
4	3	75	24	0.1388889
4	3	76	24	3.0270833
4	3	77	24	47.0666667
5	1	75	24	0.0000000
5	1	76	24	0.0000000
5	1	77	24	0.0000000
5	2	75	24	0.0000000
5	2	76	24	0.5416667
5	2	77	24	16.7840278
5	3	75	24	0.1388889
5	3	76	24	3.1298611
5	3	77	24	55.4625000

STATISTICAL ANALYSIS SYSTEM

SEASON=FALL

MEANS

SPECIES	ZONE	YEAR	N	CRAB_B
1	1	75	15	0.0000000
1	1	76	15	0.0000000
1	1	77	15	0.0000000
1	2	75	15	0.1777778
1	2	76	15	1.1400000
1	2	77	15	32.3600000
1	3	75	15	0.2222222
1	3	76	15	0.7577778
1	3	77	15	40.7933333
2	1	75	15	0.0000000
2	1	76	15	0.0000000
2	1	77	15	0.0000000
2	2	75	15	3.0555556
2	2	76	15	0.8333333
2	2	77	15	21.2566667
2	3	75	15	0.0000000
2	3	76	15	8.1944444
2	3	77	15	79.3777778
3	1	75	15	0.0000000
3	1	76	15	0.0000000
3	1	77	15	0.0000000
3	2	75	15	1.5666667
3	2	76	15	0.0000000
3	2	77	15	20.3344444
3	3	75	15	0.0222222
3	3	76	15	0.2088889
3	3	77	15	38.5755556
4	1	75	15	0.0000000
4	1	76	15	0.0000000
4	1	77	15	0.0000000
4	2	75	15	0.9333333
4	2	76	15	0.0000000
4	2	77	15	11.9377778
4	3	75	15	1.0222222
4	3	76	15	1.0588889
4	3	77	15	38.3666667
5	1	75	15	0.0000000
5	1	76	15	0.0000000
5	1	77	15	1.1111111
5	2	75	15	0.1944444
5	2	76	15	2.5177778
5	2	77	15	29.5200000
5	3	75	15	0.0888889
5	3	76	15	1.5333333
5	3	77	15	35.5777778
6	1	75	15	0.0000000
6	1	76	15	0.0000000
6	1	77	15	0.0000000
6	2	75	15	3.3222222
6	2	76	15	0.3855556
6	2	77	15	13.8866667
6	3	75	15	0.6000000
6	3	76	15	0.2522222
6	3	77	15	22.4377778

STATISTICAL ANALYSIS SYSTEM

SEASON=FALL

MEANS

SPECIES	ZONE	YEAR	N	CRAB_B
7	1	75	15	0.0000000
7	1	76	15	0.0000000
7	1	77	15	0.0000000
7	2	75	15	0.5000000
7	2	76	15	0.1222222
7	2	77	15	7.8066667
7	3	75	15	0.4222222
7	3	76	15	4.8655556
7	3	77	15	83.7022222
8	1	75	15	0.0000000
8	1	76	15	0.0000000
8	1	77	15	0.0000000
8	2	75	15	1.5333333
8	2	76	15	0.7155556
8	2	77	15	18.7733333
8	3	75	15	0.0000000
8	3	76	15	0.3066667
8	3	77	15	26.6750000

ZONE	YEAR	N	CRAB_B
1	75	120	0.0000000
1	76	120	0.0000000
1	77	120	0.1388889
2	75	120	1.4104167
2	76	120	0.7143056
2	77	120	19.4806944
3	75	120	0.2972222
3	76	120	2.1472222
3	77	120	45.6882639

STATISTICAL ANALYSIS SYSTEM

SEASON=FALL

MEANS

SPECIES	FERT	YEAR	N	CRAB_B
1	1	75	9	0.0370370
1	1	76	9	0.0814815
1	1	77	9	46.0481481
1	2	75	9	0.0000000
1	2	76	9	1.5518519
1	2	77	9	14.8888889
1	3	75	9	0.4074074
1	3	76	9	0.0000000
1	3	77	9	28.5185185
1	4	75	9	0.2222222
1	4	76	9	0.7666667
1	4	77	9	15.0592593
1	5	75	9	0.0000000
1	5	76	9	0.7629630
1	5	77	9	17.4074074
2	1	75	9	0.1111111
2	1	76	9	0.3555556
2	1	77	9	25.7777778
2	2	75	9	4.8333333
2	2	76	9	1.8055556
2	2	77	9	38.0370370
2	3	75	9	0.1481481
2	3	76	9	0.5666667
2	3	77	9	22.6518519
2	4	75	9	0.0000000
2	4	76	9	6.7481481
2	4	77	9	22.9629630
2	5	75	9	0.0000000
2	5	76	9	5.5703704
2	5	77	9	58.2944444
3	1	75	9	2.3703704
3	1	76	9	0.2333333
3	1	77	9	23.9592593
3	2	75	9	0.2777778
3	2	76	9	0.0000000
3	2	77	9	10.7740741
3	3	75	9	0.0000000
3	3	76	9	0.0481481
3	3	77	9	25.9259259
3	4	75	9	0.0000000
3	4	76	9	0.0000000
3	4	77	9	26.2148148
3	5	75	9	0.0000000
3	5	76	9	0.0666667
3	5	77	9	11.2592593
4	1	75	9	0.9629630
4	1	76	9	0.3703704
4	1	77	9	21.7777778
4	2	75	9	0.0000000
4	2	76	9	0.0259259
4	2	77	9	7.7370370
4	3	75	9	2.2962963
4	3	76	9	1.2333333
4	3	77	9	18.8888889

STATISTICAL ANALYSIS SYSTEM

SEASON=FALL

MEANS

SPECIES	FERT	YEAR	N	CRAB_B
4	4	75	9	0.0000000
4	4	76	9	0.0870370
4	4	77	9	17.6777778
4	5	75	9	0.0000000
4	5	76	9	0.0481481
4	5	77	9	17.7592593
5	1	75	9	0.0277778
5	1	76	9	0.3129630
5	1	77	9	20.9259259
5	2	75	9	0.0370370
5	2	76	9	0.9277778
5	2	77	9	18.8000000
5	3	75	9	0.0000000
5	3	76	9	2.7777778
5	3	77	9	12.0962963
5	4	75	9	0.4074074
5	4	76	9	1.7333333
5	4	77	9	21.4888889
5	5	75	9	0.0000000
5	5	76	9	1.0000000
5	5	77	9	37.0370370
6	1	75	9	5.0555556
6	1	76	9	0.3555556
6	1	77	9	15.0000000
6	2	75	9	0.7777778
6	2	76	9	0.0888889
6	2	77	9	5.1925926
6	3	75	9	0.6666667
6	3	76	9	0.5314815
6	3	77	9	12.7666667
6	4	75	9	0.0370370
6	4	76	9	0.0000000
6	4	77	9	22.5925926
6	5	75	9	0.0000000
6	5	76	9	0.0870370
6	5	77	9	4.9888889
7	1	75	9	0.2962963
7	1	76	9	0.3796296
7	1	77	9	24.6518519
7	2	75	9	0.0370370
7	2	76	9	0.5962963
7	2	77	9	22.1000000
7	3	75	9	0.8333333
7	3	76	9	5.5555556
7	3	77	9	22.3185185
7	4	75	9	0.0000000
7	4	76	9	0.4259259
7	4	77	9	44.0740741
7	5	75	9	0.3703704
7	5	76	9	1.3555556
7	5	77	9	39.3703704
8	1	75	9	0.0000000
8	1	76	9	0.0000000
8	1	77	9	23.4925926

STATISTICAL ANALYSIS SYSTEM

SEASON=FALL

MEANS

SPECIES	FERT	YEAR	N	CRAB_B
8	2	75	9	0.2222222
8	2	76	9	0.0555556
8	2	77	9	20.5148148
8	3	75	9	0.0000000
8	3	76	9	0.7222222
8	3	77	9	13.1768519
8	4	75	9	2.3333333
8	4	76	9	0.0259259
8	4	77	9	12.0222222
8	5	75	9	0.0000000
8	5	76	9	0.9000000
8	5	77	9	6.5407407

FERT	YEAR	N	CRAB_B
1	75	72	1.1076389
1	76	72	0.2611111
1	77	72	25.2041667
2	75	72	0.7731481
2	76	72	0.6314815
2	77	72	17.2555556
3	75	72	0.5439815
3	76	72	1.4293981
3	77	72	19.5429398
4	75	72	0.3750000
4	76	72	1.2233796
4	77	72	22.7615741
5	75	72	0.0462963
5	76	72	1.2238426
5	77	72	24.0821759

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

SEASON=FALL

MEANS

SPECIES	YEAR	N	CRAB_B
1	75	45	0.1333333
1	76	45	0.6325926
1	77	45	24.3844444
2	75	45	1.0185185
2	76	45	3.0092593
2	7	45	33.5448148
3	75	45	0.5296296
3	76	45	0.0696296
3	77	45	19.6266667
4	75	45	0.6518519
4	76	45	0.3529630
4	77	45	16.7681481
5	75	45	0.0944444
5	76	45	1.3503704
5	77	45	22.0696296
6	75	45	1.3074074
6	76	45	0.2125926
6	77	45	12.1081481
7	75	45	0.3074074
7	76	45	1.6625926
7	77	45	30.5029630
8	75	45	0.5111111
8	76	45	0.3407407
8	77	45	15.1494444

YEAR	N	CRAB_B
75	360	0.5692130
76	360	0.9538426
77	360	21.7692824

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

SEASON=FALL

MEANS

SPECIES	FERT	ZONE	N,	CRAB_B
1	1	1	9	0.0000000
1	1	2	9	19.4666667
1	1	3	9	26.7000000
1	2	1	9	0.0000000
1	2	2	9	9.4925926
1	2	3	9	6.9481481
1	3	1	9	0.0000000
1	3	2	9	16.4074074
1	3	3	9	12.5185185
1	4	1	9	0.0000000
1	4	2	9	2.9851852
1	4	3	9	13.0629630
1	5	1	9	0.0000000
1	5	2	9	7.7777778
1	5	3	9	10.3925926
2	1	1	9	0.0000000
2	1	2	9	0.1111111
2	1	3	9	26.1333333
2	2	1	9	0.0000000
2	2	2	9	10.2037037
2	2	3	9	34.4722222
2	3	1	9	0.0000000
2	3	2	9	7.9592593
2	3	3	9	15.4074074
2	4	1	9	0.0000000
2	4	2	9	10.2296296
2	4	3	9	19.4814815
2	5	1	9	0.0000000
2	5	2	9	13.4055556
2	5	3	9	50.4592593
3	1	1	9	0.0000000
3	1	2	9	12.8407407
3	1	3	9	13.7222222
3	2	1	9	0.0000000
3	2	2	9	2.5000000
3	2	3	9	8.5518519
3	3	1	9	0.0000000
3	3	2	9	10.0000000
3	3	3	9	15.9740741
3	4	1	9	0.0000000
3	4	2	9	11.1111111
3	4	3	9	15.1037037
3	5	1	9	0.0000000
3	5	2	9	0.0000000
3	5	3	9	11.3259259
4	1	1	9	0.0000000
4	1	2	9	5.8888889
4	1	3	9	17.2222222
4	2	1	9	0.0000000
4	2	2	9	4.7777778
4	2	3	9	2.9851852
4	3	1	9	0.0000000
4	3	2	9	0.6666667
4	3	3	9	21.7518519

STATISTICAL ANALYSIS SYSTEM

SEASON=FALL

MEANS

SPECIES	FERT	ZONE	N	CRAB_B
4	4	1	9	0.0000000
4	4	2	9	4.9740741
4	4	3	9	12.7907407
4	5	1	9	0.0000000
4	5	2	9	5.1444444
4	5	3	9	12.6629630
5	1	1	9	0.3703704
5	1	2	9	11.5981481
5	1	3	9	9.2981481
5	2	1	9	1.4814815
5	2	2	9	4.8740741
5	2	3	9	13.4092593
5	3	1	9	0.0000000
5	3	2	9	11.9111111
5	3	3	9	2.9629630
5	4	1	9	0.0000000
5	4	2	9	10.0777778
5	4	3	9	13.5518519
5	5	1	9	0.0000000
5	5	2	9	15.2592593
5	5	3	9	22.7777778
6	1	1	9	0.0000000
6	1	2	9	5.3611111
6	1	3	9	15.0500000
6	2	1	9	0.0000000
6	2	2	9	2.3407407
6	2	3	9	3.7185185
6	3	1	9	0.0000000
6	3	2	9	5.3259259
6	3	3	9	8.6388889
6	4	1	9	0.0000000
6	4	2	9	15.5555556
6	4	3	9	7.0740741
6	5	1	9	0.0000000
6	5	2	9	0.7407407
6	5	3	9	4.3351852
7	1	1	9	0.0000000
7	1	2	9	5.1333333
7	1	3	9	20.1444444
7	2	1	9	0.0000000
7	2	2	9	3.2111111
7	2	3	9	19.5222222
7	3	1	9	0.0000000
7	3	2	9	3.0555556
7	3	3	9	25.6518519
7	4	1	9	0.0000000
7	4	2	9	1.3148148
7	4	3	9	43.1851852
7	5	1	9	0.0000000
7	5	2	9	1.3333333
7	5	3	9	39.7629630
8	1	1	9	0.0000000
8	1	2	9	13.3333333
8	1	3	9	10.1592593

STATISTICAL ANALYSIS SYSTEM

SEASON=FALL

MEANS

SPECIES	FERT	ZONE	N	CRAB_B
8	2	1	9	0.0000000
8	2	2	9	9.6888889
8	2	3	9	11.1037037
8	3	1	9	0.0000000
8	3	2	9	4.7962963
8	3	3	9	9.1027778
8	4	1	9	0.0000000
8	4	2	9	4.6777778
8	4	3	9	9.7037037
8	5	1	9	0.0000000
8	5	2	9	2.5407407
8	5	3	9	4.9000000

FERT	ZONE	N	CRAB_B
1	1	72	0.0462963
1	2	72	9.2166667
1	3	72	17.3099537
2	1	72	0.1851852
2	2	72	5.8861111
2	3	72	12.5888889
3	1	72	0.0000000
3	2	72	7.5152778
3	3	72	14.0010417
4	1	72	0.0000000
4	2	72	7.6157407
4	3	72	16.7442130
5	1	72	0.0000000
5	2	72	5.7752315
5	3	72	19.5770833

STATISTICAL ANALYSIS SYSTEM

SEASON=FALL

MEANS

SPECIES	ZONE	N	CRAB_B
1	1	45	0.0000000
1	2	45	11.2259259
1	3	45	13.9244444
2	1	45	0.0000000
2	2	45	8.3818519
2	3	45	29.1907407
3	1	45	0.0000000
3	2	45	7.2903704
3	3	45	12.9355556
4	1	45	0.0000000
4	2	45	4.2903704
4	3	45	13.4825926
5	1	45	0.3703704
5	2	45	10.7440741
5	3	45	12.4000000
6	1	45	0.0000000
6	2	45	5.8648148
6	3	45	7.7633333
7	1	45	0.0000000
7	2	45	2.8096296
7	3	45	29.6633333
8	1	45	0.0000000
8	2	45	7.0074074
8	3	45	8.9938889

ZONE		N	CRAB_B
1		360	0.0462963
2		360	7.2018056
3		360	16.0442361

STATISTICAL ANALYSIS SYSTEM

SEASON=FALL

MEANS

SPECIES	FERT	N	CRAB_B
1	1	27	15.3888889
1	2	27	5.4802469
1	3	27	9.6419753
1	4	27	5.3493827
1	5	27	6.0567901
2	1	27	8.7481481
2	2	27	14.8919753
2	3	27	7.7888889
2	4	27	9.9037037
2	5	27	21.2882716
3	1	27	8.8543210
3	2	27	3.6839506
3	3	27	8.6580247
3	4	27	8.7382716
3	5	27	3.7753086
4	1	27	7.7037037
4	2	27	2.5876543
4	3	27	7.4728395
4	4	27	5.9216049
4	5	27	5.9358025
5	1	27	7.0888889
5	2	27	6.5882716
5	3	27	4.9580247
5	4	27	7.8765432
5	5	27	12.6790123
6	1	27	6.8037037
6	2	27	2.0197531
6	3	27	4.6549383
6	4	27	7.5432099
6	5	27	1.6919753
7	1	27	8.4425926
7	2	27	7.5777778
7	3	27	9.5691358
7	4	27	14.8333333
7	5	27	13.6987654
8	1	27	7.8308642
8	2	27	6.9308642
8	3	27	4.6330247
8	4	27	4.7938272
8	5	27	2.4802469

FERT	N	CRAB_B
1	216	8.8576389
2	216	6.2200617
3	216	7.1721065
4	216	8.1199846
5	216	8.4507716

STATISTICAL ANALYSIS SYSTEM

SEASON=FALL

MEANS

SPECIES	N	CRAB_B
1	135	8.3834568
2	135	12.5241975
3	135	6.7419753
4	135	5.9243210
5	135	7.8381491
6	135	4.5427160
7	135	10.8243210
8	135	5.3337654
OVERALL MEANS	1080	7.7641127

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

SEASON=FALL

ANALYSIS OF VARIANCE FOR VARIABLE CRAB_B   MEAN 7.76411265   C.V. 211.989772 %

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	LSD .01	LSD .05	DIVISOR
REP	2	13591.009	6795.5044			
ZONE	2	46238.876	23119.4382			
ERROR A	4	7632.932	1908.2329	14.9907608	9.03987408	360
YEAR	2	105944.810	52972.4051			
ZONE*YEAR	4	79608.266	19902.0666			
ERROR B	12	33226.276	2768.8563			
SPECIES	7	7172.001	1024.5716			
FERT	4	978.158	244.5395			
SPECIES*FERT	28	8983.444	320.8373			
SPECIES*ZONE	14	18498.052	1321.2894			
FERT*ZONE	8	1816.036	227.0044			
SPECIES*FERT*ZONE	56	12904.237	230.4328			
ERROR C	234	69966.055	299.0002			
SPECIES*YEAR	14	10689.839	763.5600			
FERT*YEAR	8	2266.282	283.2852			
SPECIES*FERT*YEAR	56	17330.188	309.4677			

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

SEASON=FALL

ANALYSIS OF VARIANCE FOR VARIABLE CRAB_B   MEAN 7.76411265   C.V. 211.989772 %

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	LSD .01	LSD .05	DIVISOR
SPECIES*ZONE*YEAR	28	27893.569	996.1989			
FERT*ZONE*YEAR	16	3028.615	199.2885			
SPECIES*FERT*ZONE*YEAR	112	28909.947	258.1156			
ERROR D	468	126782.504	270.9028			
LSD_SPECIES	234	69966.055	299.0002	5.46577835	4.14656448	135
LSD_FERT	234	69966.055	299.0002	4.32107830	3.27814770	216
LSD_SP*F	234	69966.055	299.0002	12.2218552	9.27200317	27
LSD_SP*Z	234	69966.055	299.0002	9.46700668	7.18206120	45
LSD_SP*Y	468	126782.504	270.9028	8.97434521	6.81858444	45
RESIDUAL	468	126782.504	270.9028			
CORRECTED TOTAL	1079	623460.098	577.8129			

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB > F
NUMERATOR:	YEAR	2	105944.810	52972.4051	19.13151	0.0004
DENOMINATOR:	ERROR B	12	33226.276	2768.8563		
NUMERATOR:	ZONE*YEAR	4	79608.266	19902.0666	7.18783	0.0038
DENOMINATOR:	ERROR B	12	33226.276	2768.8563		
NUMERATOR:	SPECIES	7	7172.001	1024.5716	3.42666	0.0020
DENOMINATOR:	ERROR C	234	69966.055	299.0002		
NUMERATOR:	FERT	4	978.158	244.5395	0.81786	0.5169
DENOMINATOR:	ERROR C	234	69966.055	299.0002		

STATISTICAL ANALYSIS SYSTEM

SEASON=FALL

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB > F
NUMERATOR:	SPECIES*FERT	28	8983.444	320.8373	1.07303	0.3724
DENOMINATOR:	ERROR C	234	69966.055	299.0002		
NUMERATOR:	SPECIES*ZONE	14	18498.052	1321.2894	4.41902	0.0001
DENOMINATOR:	ERROR C	234	69966.055	299.0002		
NUMERATOR:	FERT*ZONE	8	1816.036	227.0044	0.75921	0.6407
DENOMINATOR:	ERROR C	234	69966.055	299.0002		
NUMERATOR:	SPECIES*FERT*ZONE	56	12904.237	230.4328	0.77068	0.8767
DENOMINATOR:	ERROR C	234	69966.055	299.0002		
NUMERATOR:	SPECIES*YEAR	14	10689.839	763.5600	2.81858	0.0007
DENOMINATOR:	ERROR D	468	126782.504	270.9028		
NUMERATOR:	FERT*YEAR	8	2266.282	283.2852	1.04571	0.4007
DENOMINATOR:	ERROR D	468	126782.504	270.9028		
NUMERATOR:	SPECIES*FERT*YEAR	56	17330.188	309.4677	1.14236	0.2330
DENOMINATOR:	ERROR D	468	126782.504	270.9028		

C50

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M
SEASON=SPRING

MEANS

SPECIES	FERT	ZONE	YEAR	N	STEM_DEN
1	1	1	76	3	0.00000
1	1	1	77	3	0.00000
1	1	2	76	3	0.00000
1	1	2	77	3	17.33333
1	1	3	76	3	3.50000
1	1	3	77	3	65.16667
1	2	1	76	3	0.00000
1	2	1	77	3	0.00000
1	2	2	76	3	0.33333
1	2	2	77	3	3.00000
1	2	3	76	3	7.33333
1	2	3	77	3	58.33333
1	3	1	76	3	0.00000
1	3	1	77	3	0.00000
1	3	2	76	3	0.00000
1	3	2	77	3	4.44444
1	3	3	76	3	11.91667
1	3	3	77	3	60.00000
1	4	1	76	3	0.00000
1	4	1	77	3	0.00000
1	4	2	76	3	0.22222
1	4	2	77	3	0.66667
1	4	3	76	3	2.33333
1	4	3	77	3	100.66667
1	5	1	76	3	0.00000
1	5	1	77	3	0.00000
1	5	2	76	3	18.66667
1	5	2	77	3	39.66667
1	5	3	76	3	11.25000
1	5	3	77	3	36.00000
2	1	1	76	3	0.00000
2	1	1	77	3	0.00000
2	1	2	76	3	0.00000
2	1	2	77	3	3.00000
2	1	3	76	3	130.00000
2	1	3	77	3	775.83333
2	2	1	76	3	0.00000
2	2	1	77	3	0.00000
2	2	2	76	3	14.00000
2	2	2	77	3	53.66667
2	2	3	76	3	60.91667
2	2	3	77	3	1112.50000
2	3	1	76	3	0.00000
2	3	1	77	3	0.00000
2	3	2	76	3	2.66667
2	3	2	77	3	43.00000
2	3	3	76	3	15.25000
2	3	3	77	3	401.33333
2	4	1	76	3	0.00000
2	4	1	77	3	0.00000
2	4	2	76	3	0.66667
2	4	2	77	3	116.66667
2	4	3	76	3	82.16667
2	4	3	77	3	1130.66667

STATISTICAL ANALYSIS SYSTEM

SEASON=SPRING

MEANS

SPECIES	FERT	ZONE	YEAR	N	STEM_DEN
2	5	1	76	3	0.000000
2	5	1	77	3	0.000000
2	5	2	76	3	0.833333
2	5	2	77	3	1.333333
2	5	3	76	3	98.944444
2	5	3	77	3	867.000000
3	1	1	76	3	0.000000
3	1	1	77	3	0.000000
3	1	2	76	3	0.000000
3	1	2	77	3	2.000000
3	1	3	76	3	0.666667
3	1	3	77	3	2.000000
3	2	1	76	3	0.000000
3	2	1	77	3	0.000000
3	2	2	76	3	6.666667
3	2	2	77	3	9.333333
3	2	3	76	3	0.666667
3	2	3	77	3	0.000000
3	3	1	76	3	0.000000
3	3	1	77	3	0.000000
3	3	2	76	3	0.000000
3	3	2	77	3	3.000000
3	3	3	76	3	0.000000
3	3	3	77	3	14.166667
3	4	1	76	3	0.000000
3	4	1	77	3	0.000000
3	4	2	76	3	6.666667
3	4	2	77	3	2.666667
3	4	3	76	3	0.333333
3	4	3	77	3	1.000000
3	5	1	76	3	0.000000
3	5	1	77	3	0.000000
3	5	2	76	3	0.000000
3	5	2	77	3	2.333333
3	5	3	76	3	4.500000
3	5	3	77	3	3.000000
4	1	1	76	3	1.666667
4	1	1	77	3	0.000000
4	1	2	76	3	0.000000
4	1	2	77	3	2.000000
4	1	3	76	3	33.444444
4	1	3	77	3	353.000000
4	2	1	76	3	0.000000
4	2	1	77	3	0.000000
4	2	2	76	3	0.000000
4	2	2	77	3	1.333333
4	2	3	76	3	3.583333
4	2	3	77	3	526.833333
4	3	1	76	3	0.000000
4	3	1	77	3	0.000000
4	3	2	76	3	0.000000
4	3	2	77	3	3.000000
4	3	3	76	3	0.666667
4	3	3	77	3	69.500000

STATISTICAL ANALYSIS SYSTEM

SEASON=SPRING

MEANS

SPECIES	FERT	ZONE	YEAR	N	STEM_DEN
4	4	1	76	3	0.000000
4	4	1	77	3	0.000000
4	4	2	76	3	0.333333
4	4	2	77	3	21.666667
4	4	3	76	3	27.250000
4	4	3	77	3	81.666667
4	5	1	76	3	0.000000
4	5	1	77	3	0.000000
4	5	2	76	3	0.000000
4	5	2	77	3	0.666667
4	5	3	76	3	10.000000
4	5	3	77	3	340.333333
5	1	1	76	3	0.777778
5	1	1	77	3	50.000000
5	1	2	76	3	8.833333
5	1	2	77	3	33.333333
5	1	3	76	3	4.027778
5	1	3	77	3	7.000000
5	2	1	76	3	0.555556
5	2	1	77	3	53.666667
5	2	2	76	3	12.750000
5	2	2	77	3	41.000000
5	2	3	76	3	4.250000
5	2	3	77	3	15.833333
5	3	1	76	3	20.000000
5	3	1	77	3	0.000000
5	3	2	76	3	60.583333
5	3	2	77	3	68.833333
5	3	3	76	3	1.555556
5	3	3	77	3	11.166667
5	4	1	76	3	0.000000
5	4	1	77	3	0.000000
5	4	2	76	3	17.750000
5	4	2	77	3	31.555556
5	4	3	76	3	14.666667
5	4	3	77	3	13.833333
5	5	1	76	3	4.166667
5	5	1	77	3	14.777778
5	5	2	76	3	17.750000
5	5	2	77	3	19.166667
5	5	3	76	3	14.083333
5	5	3	77	3	38.333333
6	1	1	76	3	0.000000
6	1	1	77	3	0.000000
6	1	2	76	3	3.333333
6	1	2	77	3	48.333333
6	1	3	76	3	2.500000
6	1	3	77	3	134.000000
6	2	1	76	3	0.000000
6	2	1	77	3	0.000000
6	2	2	76	3	0.583333
6	2	2	77	3	23.333333
6	2	3	76	3	3.805556
6	2	3	77	3	8.666667

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

SEASON=SPRING

MEANS

SPECIES	FERT	ZONE	YEAR	N	STEM_DEN
6	3	1	76	3	0.00000
6	3	1	77	3	0.00000
6	3	2	76	3	3.41667
6	3	2	77	3	16.33333
6	3	3	76	3	2.25000
6	3	3	77	3	42.50000
6	4	1	76	3	0.00000
6	4	1	77	3	0.00000
6	4	2	76	3	0.00000
6	4	2	77	3	6.00000
6	4	3	76	3	3.86111
6	4	3	77	3	10.16667
6	5	1	76	3	0.00000
6	5	1	77	3	0.00000
6	5	2	76	3	1.66667
6	5	2	77	3	16.66667
6	5	3	76	3	2.63889
6	5	3	77	3	28.33333
7	1	1	76	3	0.00000
7	1	1	77	3	0.00000
7	1	2	76	3	3.33333
7	1	2	77	3	3.33333
7	1	3	76	3	12.16667
7	1	3	77	3	900.00000
7	2	1	76	3	0.00000
7	2	1	77	3	0.00000
7	2	2	76	3	0.33333
7	2	2	77	3	0.00000
7	2	3	76	3	209.94444
7	2	3	77	3	921.66667
7	3	1	76	3	0.00000
7	3	1	77	3	0.00000
7	3	2	76	3	0.00000
7	3	2	77	3	1.00000
7	3	3	76	3	65.33333
7	3	3	77	3	2333.33333
7	4	1	76	3	0.00000
7	4	1	77	3	0.00000
7	4	2	76	3	0.00000
7	4	2	77	3	3.33333
7	4	3	76	3	818.13889
7	4	3	77	3	2283.33333
7	5	1	76	3	0.00000
7	5	1	77	3	0.00000
7	5	2	76	3	0.00000
7	5	2	77	3	4.66667
7	5	3	76	3	372.41667
7	5	3	77	3	1466.66667
8	1	1	76	3	0.00000
8	1	1	77	3	0.00000
8	1	2	76	3	0.00000
8	1	2	77	3	0.00000
8	1	3	76	3	0.00000
8	1	3	77	3	0.00000

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

SEASON=SPRING

MEANS

SPECIES	FERT	ZONE	YEAR	N	STEM_DEN
8	2	1	76	3	0.000000
8	2	1	77	3	0.000000
8	2	2	76	3	0.000000
8	2	2	77	3	1.333333
3	2	3	76	3	0.000000
8	2	3	77	3	0.000000
8	3	1	76	3	0.000000
8	3	1	77	3	0.000000
8	3	2	76	3	0.000000
8	3	2	77	3	6.666667
8	3	3	76	3	0.000000
8	3	3	77	3	33.333333
8	4	1	76	3	0.000000
8	4	1	77	3	0.000000
8	4	2	76	3	0.000000
8	4	2	77	3	0.333333
8	4	3	76	3	0.000000
8	4	3	77	3	10.000000
8	5	1	76	3	0.000000
8	5	1	77	3	0.000000
8	5	2	76	3	0.000000
8	5	2	77	3	1.666667
8	5	3	76	3	16.000000
8	5	3	77	3	0.000000

STATISTICAL ANALYSIS SYSTEM

SEASON=SPRING

MEANS

FERT	ZONE	YEAR	N	STEM_DEN
1	1	76	24	0.305556
1	1	77	24	6.250000
1	2	76	24	1.937500
1	2	77	24	13.666667
1	3	76	24	23.288194
1	3	77	24	279.625000
2	1	76	24	0.069444
2	1	77	24	6.708333
2	2	76	24	4.333333
2	2	77	24	16.625000
2	3	76	24	36.312500
2	3	77	24	330.479167
3	1	76	24	2.500000
3	1	77	24	0.000000
3	2	76	24	8.333333
3	2	77	24	18.284722
3	3	76	24	12.121528
3	3	77	24	370.666667
4	1	76	24	0.000000
4	1	77	24	0.000000
4	2	76	24	3.204861
4	2	77	24	22.861111
4	3	76	24	118.593750
4	3	77	24	453.916667
5	1	76	24	0.520833
5	1	77	24	1.847222
5	2	76	24	4.864583
5	2	77	24	10.770833
5	3	76	24	66.229167
5	3	77	24	347.458333

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

SEASON=SPRING

MEANS

SPECIES	ZONE	YEAR	N	STEM_DEN
1	1	76	15	0.00000
1	1	77	15	0.00000
1	2	76	15	3.84444
1	2	77	15	13.02222
1	3	76	15	7.26667
1	3	77	15	64.03333
2	1	76	15	0.00000
2	1	77	15	0.00000
2	2	76	15	3.63333
2	2	77	15	43.53333
2	3	76	15	77.45556
2	3	77	15	857.46667
3	1	76	15	0.00000
3	1	77	15	0.00000
3	2	76	15	2.66667
3	2	77	15	3.86667
3	3	76	15	1.23333
3	3	77	15	4.03333
4	1	76	15	0.33333
4	1	77	15	0.00000
4	2	76	15	0.06667
4	2	77	15	5.73333
4	3	76	15	14.98889
4	3	77	15	274.26667
5	1	76	15	5.10000
5	1	77	15	23.68889
5	2	76	15	23.53333
5	2	77	15	38.77778
5	3	76	15	7.71667
5	3	77	15	17.23333
6	1	76	15	0.00000
6	1	77	15	0.00000
6	2	76	15	1.80000
6	2	77	15	22.13333
6	3	76	15	3.01111
6	3	77	15	44.73333
7	1	76	15	0.00000
7	1	77	15	0.00000
7	2	76	15	0.73333
7	2	77	15	2.46667
7	3	76	15	295.60000
7	3	77	15	1581.00000
8	1	76	15	0.00000
8	1	77	15	0.00000
8	2	76	15	0.00000
8	2	77	15	2.00000
8	3	76	15	3.20000
8	3	77	15	8.66667

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

SEASON=SPRING

MEANS

ZONE	YEAR	N	STEM_DEN
1	76	120	0.679167
1	77	120	2.961111
2	76	120	4.534722
2	77	120	16.441667
3	76	120	51.309028
3	77	120	356.429167

STATISTICAL ANALYSIS SYSTEM

SEASON=SPRING

MEANS

SPECIES	FERT	YEAR	N	STEM_DEN
1	1	76	9	1.166667
1	1	77	9	27.500000
1	2	76	9	2.555556
1	2	77	9	20.444444
1	3	76	9	3.972222
1	3	77	9	21.481481
1	4	76	9	0.851852
1	4	77	9	33.777778
1	5	76	9	9.972222
1	5	77	9	25.222222
2	1	76	9	43.333333
2	1	77	9	259.611111
2	2	76	9	24.972222
2	2	77	9	398.722222
2	3	76	9	5.972222
2	3	77	9	148.111111
2	4	76	9	27.611111
2	4	77	9	415.777778
2	5	76	9	33.259259
2	5	77	9	289.444444
3	1	76	9	0.222222
3	1	77	9	1.333333
3	2	76	9	2.444444
3	2	77	9	3.111111
3	3	76	9	0.000000
3	3	77	9	5.722222
3	4	76	9	2.333333
3	4	77	9	1.222222
3	5	76	9	1.500000
3	5	77	9	1.777778
4	1	76	9	11.703704
4	1	77	9	118.333333
4	2	76	9	1.194444
4	2	77	9	176.055556
4	3	76	9	0.222222
4	3	77	9	24.166667
4	4	76	9	9.194444
4	4	77	9	34.444444
4	5	76	9	3.333333
4	5	77	9	113.666667
5	1	76	9	4.546296
5	1	77	9	30.111111
5	2	76	9	5.851852
5	2	77	9	36.833333
5	3	76	9	27.379630
5	3	77	9	26.666667
5	4	76	9	10.805556
5	4	77	9	15.129630
5	5	76	9	12.000000
5	5	77	9	24.092593
6	1	76	9	1.744444
6	1	77	9	63.777778
6	2	76	9	1.462963
6	2	77	9	10.666667

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

SEASON=SPRING

MEANS

SPECIES	FERT	YEAR	N	STEM_DEN
6	3	76	9	1.888889
6	3	77	9	19.611111
6	4	76	9	1.287037
6	4	77	9	5.388889
6	5	76	9	1.435185
6	5	77	9	15.000000
7	1	76	9	5.166667
7	1	77	9	301.111111
7	2	76	9	75.092593
7	2	77	9	307.222222
7	3	76	9	21.777778
7	3	77	9	778.111111
7	4	76	9	272.712963
7	4	77	9	762.222222
7	5	76	9	124.138889
7	5	77	9	490.444444
8	1	76	9	0.000000
8	1	77	9	0.000000
8	2	76	9	0.000000
8	2	77	9	0.444444
8	3	76	9	0.000000
8	3	77	9	13.333333
8	4	76	9	0.000000
8	4	77	9	3.444444
8	5	76	9	5.333333
8	5	77	9	0.555556

FERT	YEAR	N	STEM_DEN
1	76	72	8.510417
1	77	72	99.847222
2	76	72	13.571759
2	77	72	117.937500
3	76	72	7.651620
3	77	72	129.650463
4	76	72	40.549537
4	77	72	158.925926
5	76	72	23.871528
5	77	72	120.025463

STATISTICAL ANALYSIS SYSTEM

SEASON=SPRING

MEANS

SPECIES	YEAR	N	STEM_DEN
1	76	45	3.703704
1	77	45	25.685185
2	76	45	27.029630
2	77	45	300.333333
3	76	45	1.300000
3	77	45	2.033333
4	76	45	5.129630
4	77	45	93.333333
5	76	45	12.116667
5	77	45	26.566667
6	76	45	1.603704
6	77	45	22.288889
7	76	45	98.777778
7	77	45	527.622222
8	76	45	1.066667
8	77	45	3.555556

YEAR	N	STEM_DEN
76	360	18.840972
77	360	125.277315

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

SEASON=SPRING

MEANS

SPECIES	FERT	ZONE	N	STEM_DEN
1	1	1	6	0.000000
1	1	2	6	8.666667
1	1	3	6	34.333333
1	2	1	6	0.000000
1	2	2	6	1.666667
1	2	3	6	32.833333
1	3	1	6	0.000000
1	3	2	6	2.222222
1	3	3	6	35.958333
1	4	1	6	0.000000
1	4	2	6	0.444444
1	4	3	6	51.500000
1	5	1	6	0.000000
1	5	2	6	29.166667
1	5	3	6	23.625000
2	1	1	6	0.000000
2	1	2	6	1.500000
2	1	3	6	452.316667
2	2	1	6	0.000000
2	2	2	6	33.833333
2	2	3	6	586.708333
2	3	1	6	0.000000
2	3	2	6	22.833333
2	3	3	6	208.291667
2	4	1	6	0.000000
2	4	2	6	58.666667
2	4	3	6	606.416667
2	5	1	6	0.000000
2	5	2	6	1.083333
2	5	3	6	482.972222
3	1	1	6	0.000000
3	1	2	6	1.000000
3	1	3	6	1.333333
3	2	1	6	0.000000
3	2	2	6	8.000000
3	2	3	6	0.333333
3	3	1	6	0.000000
3	3	2	6	1.500000
3	3	3	6	7.083333
3	4	1	6	0.000000
3	4	2	6	4.666667
3	4	3	6	0.666667
3	5	1	6	0.000000
3	5	2	6	1.166667
3	5	3	6	3.750000
4	1	1	6	0.833333
4	1	2	6	1.000000
4	1	3	6	193.222222
4	2	1	6	0.000000
4	2	2	6	0.666667
4	2	3	6	265.208333
4	3	1	6	0.000000
4	3	2	6	1.500000
4	3	3	6	35.083333

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

SEASON=SPRING

MEANS

SPECIES	FERT	ZONE	N	STEM_DEN
4	4	1	6	0.00000
4	4	2	6	11.00000
4	4	3	6	54.45833
4	5	1	6	0.00000
4	5	2	6	0.33333
4	5	3	6	175.16667
5	1	1	6	25.38889
5	1	2	6	21.08333
5	1	3	6	5.51389
5	2	1	6	27.11111
5	2	2	6	26.87500
5	2	3	6	10.04167
5	3	1	6	10.00000
5	3	2	6	64.70833
5	3	3	6	6.36111
5	4	1	6	0.00000
5	4	2	6	24.65278
5	4	3	6	14.25000
5	5	1	6	9.47222
5	5	2	6	18.45833
5	5	3	6	26.20833
6	1	1	6	0.00000
6	1	2	6	25.83333
6	1	3	6	68.25000
6	2	1	6	0.00000
6	2	2	6	11.95833
6	2	3	6	6.23611
6	3	1	6	0.00000
6	3	2	6	9.87500
6	3	3	6	22.37500
6	4	1	6	0.00000
6	4	2	6	3.00000
6	4	3	6	7.01389
6	5	1	6	0.00000
6	5	2	6	9.16667
6	5	3	6	15.48611
7	1	1	6	0.00000
7	1	2	6	3.33333
7	1	3	6	456.08333
7	2	1	6	0.00000
7	2	2	6	0.16667
7	2	3	6	565.80556
7	3	1	6	0.00000
7	3	2	6	0.50000
7	3	3	6	1199.33333
7	4	1	6	0.00000
7	4	2	6	1.66667
7	4	3	6	1550.73611
7	5	1	6	0.00000
7	5	2	6	2.33333
7	5	3	6	919.54167
8	1	1	6	0.00000
8	1	2	6	0.00000
8	1	3	6	0.00000

STATISTICAL ANALYSIS SYSTEM

SEASON=SPRING

MEANS

SPECIES	FERT	ZONE	N	STEM_DEN
8	2	1	6	0.000000
8	2	2	6	0.666667
8	2	3	6	0.000000
8	3	1	6	0.000000
8	3	2	6	3.333333
8	3	3	6	16.666667
8	4	1	6	0.000000
8	4	2	6	0.166667
8	4	3	6	5.000000
8	5	1	6	0.000000
8	5	2	6	0.833333
8	5	3	6	8.000000

FERT	ZONE	N	STEM_DEN
1	1	48	3.277778
1	2	48	7.802083
1	3	48	151.456597
2	1	48	3.388889
2	2	48	10.479167
2	3	48	183.395833
3	1	48	1.250000
3	2	48	13.309028
3	3	48	191.394097
4	1	48	0.000000
4	2	48	13.032986
4	3	48	286.255208
5	1	48	1.184028
5	2	48	7.817708
5	3	48	206.843750

STATISTICAL ANALYSIS SYSTEM

SEASON=SPRING

MEANS

SPECIES	ZONE	N	STEM_DEN
1	1	30	0.000000
1	2	30	8.433333
1	3	30	35.650000
2	1	30	0.000000
2	2	30	23.583333
2	3	30	467.461111
3	1	30	0.000000
3	2	30	3.266667
3	3	30	2.633333
4	1	30	0.166667
4	2	30	2.900000
4	3	30	144.627778
5	1	30	14.394444
5	2	30	31.155556
5	3	30	12.475000
6	1	30	0.000000
6	2	30	11.966667
6	3	30	23.872222
7	1	30	0.000000
7	2	30	1.600000
7	3	30	938.300000
8	1	30	0.000000
8	2	30	1.000000
8	3	30	5.933333

ZONE		N	STEM_DEN
1		240	1.820139
2		240	10.488194
3		240	203.869097

STATISTICAL ANALYSIS SYSTEM

SEASON=SPRING

MEANS

SPECIES	FERT	N	STEM_DEN
1	1	18	14.333333
1	2	18	11.500000
1	3	18	12.726852
1	4	18	17.314815
1	5	18	17.597222
2	1	18	151.472222
2	2	18	206.847222
2	3	18	77.041667
2	4	18	221.694444
2	5	18	161.351852
3	1	18	0.777778
3	2	18	2.777778
3	3	18	2.861111
3	4	18	1.777778
3	5	18	1.638889
4	1	18	65.018519
4	2	18	88.625000
4	3	18	12.194444
4	4	18	21.819444
4	5	18	58.500000
5	1	18	17.328704
5	2	18	21.342593
5	3	18	27.023148
5	4	18	12.967593
5	5	19	18.046296
6	1	18	31.361111
6	2	18	6.064815
6	3	18	10.750000
6	4	18	3.337963
6	5	18	8.217593
7	1	18	153.138889
7	2	18	188.657407
7	3	18	399.944444
7	4	18	517.467593
7	5	18	307.291667
8	1	18	0.000000
8	2	18	0.222222
8	3	18	6.666667
8	4	18	1.722222
8	5	18	2.944444

FERT	N	STEM_DEN
1	144	54.178819
2	144	65.754630
3	144	68.651042
4	144	99.762731
5	144	71.948495

STATISTICAL ANALYSIS SYSTEM

SEASON=SPRING

MEANS

SPECIES	N	STEM_DEN
1	90	14.594444
2	90	163.681481
3	90	1.966667
4	90	49.231481
5	90	19.341667
6	90	11.946296
7	90	313.300000
8	90	2.311111
OVERALL MEANS	720	72.059144

STATISTICAL ANALYSIS SYSTEM
SEASON=SPRING

ANALYSIS OF VARIANCE FOR VARIABLE STEM_DEN   MEAN 72.0591435   C.V. 279.489969 %

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	LSD .01	LSD .05	DIVISOR
REP	2	428815.7	214407.83			
ZONE	2	6263607.2	3131803.61			
ERROR A	4	631950.0	157987.50	167.057083	100.740387	240
YEAR	1	2039165.1	2039165.10			
ZONE*YEAR	2	3555551.8	1777775.90			
ERROR B	6	1431694.1	238615.69			
SPECIES	7	7791664.0	1113094.86			
FERT	4	163953.9	40988.49			
SPECIES*FERT	28	1779817.0	63564.89			
SPECIES*ZONE	14	15921721.6	1137265.83			
FERT*ZONE	8	323513.8	40439.23			
SPECIES*FERT*ZONE	56	3509672.3	62672.72			
ERROR C	234	11049009.6	47217.99			
SPECIES*YEAR	7	3983675.0	569096.42			
FERT*YEAR	4	25976.7	6494.18			
SPECIES*FERT*YEAR	28	1013060.8	36180.74			

STATISTICAL ANALYSIS SYSTEM

SEASON=SPRING

ANALYSIS OF VARIANCE FOR VARIABLE STEM_DEN   MEAN 72.0591435   C.V. 279.489969 %

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	LSD .01	LSD .05	DIVISOR
SPECIES*ZONE*YEAR	14	7939322.5	567094.46			
FERT*ZONE*YEAR	8	58004.8	7250.59			
SPECIES*FERT*ZONE*YEAR	56	1944726.4	34727.26			
ERROR D	234	9491317.5	40561.19			
LSD_SPECIES	234	11049009.6	47217.99	84.1231689	63.8193054	90
LSD_FERT	234	11049009.6	47217.99	66.5052032	50.4535828	144
LSD_SP*F	234	11049009.6	47217.99	188.105164	142.704330	18
LSD_SP*Z	234	11049009.6	47217.99	145.705627	110.538300	30
LSD_SP*Y	234	9491317.5	40561.19	110.263626	83.6505280	45
RESIDUAL	234	9491317.5	40561.19			
CORRECTED TOTAL	719	79346219.8	110356.36			

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB > F
NUMERATOR:	YEAR	1	2039165.1	2039165.10	8.54581	0.0260
DENOMINATOR:	ERROR B	6	1431694.1	238615.69		
NUMERATOR:	ZONE*YEAR	2	3555551.8	1777775.90	7.45037	0.0240
DENOMINATOR:	ERROR B	6	1431694.1	238615.69		
NUMERATOR:	SPECIES	7	7791664.0	1113094.86	23.57353	0.0001
DENOMINATOR:	ERROR C	234	11049009.6	47217.99		
NUMERATOR:	FERT	4	163953.9	40988.49	0.86807	0.5143
DENOMINATOR:	ERROR C	234	11049009.6	47217.99		

C69

AD-A062 867 GEORGIA UNIV BRUNSWICK MARINE EXTENSION SERVICE F/G 13/2
HABITAT DEVELOPMENT FIELD INVESTIGATIONS BUTTERMILK SOUND MARSH--ETC(U)
JUL 78 R J REIMOLD, M A HARDISKY, P C ADAMS DACW21-75-C-0074
UNCLASSIFIED WES-TR-D-78-26-APP-A NL

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STATISTICAL ANALYSIS SYSTEM

SEASON=SPRING

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB > F
NUMERATOR:	SPECIES*FERT	28	1779317.0	63564.89	1.34620	0.1223
DENOMINATOR:	ERROR C	234	11049009.6	47217.99		
NUMERATOR:	SPECIES*ZONE	14	15921721.6	1137265.83	24.08544	0.0001
DENOMINATOR:	ERROR C	234	11049009.6	47217.99		
NUMERATOR:	FERT*ZONE	8	323513.8	40439.23	0.85644	0.5549
DENOMINATOR:	ERROR C	234	11049009.6	47217.99		
NUMERATOR:	SPECIES*FERT*ZONE	56	3509672.3	62672.72	1.32731	0.0771
DENOMINATOR:	ERROR C	234	11049009.6	47217.99		
NUMERATOR:	SPECIES*YEAR	7	3983675.0	569096.42	14.03057	0.0001
DENOMINATOR:	ERROR D	234	9491317.5	40561.19		
NUMERATOR:	FERT*YEAR	4	25976.7	6494.18	0.16011	0.9557
DENOMINATOR:	ERROR D	234	9491317.5	40561.19		
NUMERATOR:	SPECIES*FERT*YEAR	28	1013060.8	36180.74	0.89200	0.6269
DENOMINATOR:	ERROR D	234	9491317.5	40561.19		

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

SEASON=SPRING

DATA SET PASS

CLASSES	VALUES
REP	1 2 3
SPECIES	1 2 3 4 5 6 7 8
FERT	1 2 3 4 5
ZONE	1 2 3
YEAR	76 77

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

SEASON=SPRING

MEANS

SPECIES	FERT	ZONE	YEAR	N	CRAB_B
1	1	1	76	3	0.0000000
1	1	1	77	3	0.0000000
1	1	2	76	3	0.0000000
1	1	2	77	3	0.0000000
1	1	3	76	3	0.0000000
1	1	3	77	3	0.0000000
1	2	1	76	3	0.0000000
1	2	1	77	3	0.0000000
1	2	2	76	3	0.0000000
1	2	2	77	3	1.1111111
1	2	3	76	3	0.0000000
1	2	3	77	3	0.0000000
1	3	1	76	3	0.0000000
1	3	1	77	3	0.0000000
1	3	2	76	3	0.0000000
1	3	2	77	3	0.0000000
1	3	3	76	3	0.0000000
1	3	3	77	3	1.1444444
1	4	1	76	3	0.0000000
1	4	1	77	3	0.0000000
1	4	2	76	3	0.0000000
1	4	2	77	3	0.0000000
1	4	3	76	3	0.0000000
1	4	3	77	3	0.0000000
1	5	1	76	3	0.0000000
1	5	1	77	3	0.0000000
1	5	2	76	3	0.0000000
1	5	2	77	3	0.0000000
1	5	3	76	3	0.0000000
1	5	3	77	3	10.5555556
2	1	1	76	3	0.0000000
2	1	1	77	3	0.0000000
2	1	2	76	3	0.0000000
2	1	2	77	3	0.0000000
2	1	3	76	3	0.0000000
2	1	3	77	3	0.2222222
2	2	1	76	3	0.0000000
2	2	1	77	3	0.0000000
2	2	2	76	3	0.0000000
2	2	2	77	3	1.1888889
2	2	3	76	3	0.0000000
2	2	3	77	3	8.8888889
2	3	1	76	3	0.0000000
2	3	1	77	3	0.0000000
2	3	2	76	3	0.1666667
2	3	2	77	3	0.1111111
2	3	3	76	3	0.0000000
2	3	3	77	3	17.8666667
2	4	1	76	3	0.0000000
2	4	1	77	3	0.0000000
2	4	2	76	3	0.3333333
2	4	2	77	3	0.0000000
2	4	3	76	3	0.0000000
2	4	3	77	3	4.0666667

STATISTICAL ANALYSIS SYSTEM

SEASON=SPRING

MEANS

SPECIES	FERT	ZONE	YEAR	N	CRAB_B
2	5	1	76	3	0.00000000
2	5	1	77	3	0.00000000
2	5	2	76	3	0.00000000
2	5	2	77	3	0.00000000
2	5	3	76	3	0.00000000
2	5	3	77	3	6.91111111
3	1	1	76	3	0.00000000
3	1	1	77	3	0.00000000
3	1	2	76	3	0.00000000
3	1	2	77	3	0.00000000
3	1	3	76	3	0.00000000
3	1	3	77	3	0.00000000
3	2	1	76	3	0.00000000
3	2	1	77	3	0.00000000
3	2	2	76	3	0.00000000
3	2	2	77	3	6.66666667
3	2	3	76	3	0.00000000
3	2	3	77	3	1.11111111
3	3	1	76	3	0.00000000
3	3	1	77	3	0.00000000
3	3	2	76	3	0.00000000
3	3	2	77	3	0.00000000
3	3	3	76	3	0.00000000
3	3	3	77	3	0.00000000
3	4	1	76	3	0.00000000
3	4	1	77	3	0.00000000
3	4	2	76	3	0.00000000
3	4	2	77	3	0.00000000
3	4	3	76	3	0.00000000
3	4	3	77	3	0.00000000
3	5	1	76	3	0.00000000
3	5	1	77	3	0.00000000
3	5	2	76	3	0.00000000
3	5	2	77	3	0.00000000
3	5	3	76	3	0.00000000
3	5	3	77	3	0.62222222
4	1	1	76	3	0.00000000
4	1	1	77	3	0.00000000
4	1	2	76	3	0.00000000
4	1	2	77	3	0.00000000
4	1	3	76	3	0.00000000
4	1	3	77	3	0.00000000
4	2	1	76	3	0.00000000
4	2	1	77	3	0.00000000
4	2	2	76	3	0.00000000
4	2	2	77	3	0.00000000
4	2	3	76	3	0.00000000
4	2	3	77	3	0.00000000
4	3	1	76	3	0.00000000
4	3	1	77	3	0.00000000
4	3	2	76	3	0.00000000
4	3	2	77	3	0.00000000
4	3	3	76	3	1.91666667
4	3	3	77	3	1.40000000

STATISTICAL ANALYSIS SYSTEM

SEASON=SPRING

MEANS

SPECIES	FERT	ZONE	YEAR	N	CHAR_B
4	4	1	76	3	0.0000000
4	4	1	77	3	0.0000000
4	4	2	76	3	0.0000000
4	4	2	77	3	0.0000000
4	4	3	76	3	0.1666667
4	4	3	77	3	0.0222222
4	5	1	76	3	0.0000000
4	5	1	77	3	0.0000000
4	5	2	76	3	0.0000000
4	5	2	77	3	0.0666667
4	5	3	76	3	0.0000000
4	5	3	77	3	0.0000000
5	1	1	76	3	0.0000000
5	1	1	77	3	0.0000000
5	1	2	76	3	0.0000000
5	1	2	77	3	0.1166667
5	1	3	76	3	0.2222222
5	1	3	77	3	0.1444444
5	2	1	76	3	0.0000000
5	2	1	77	3	0.0000000
5	2	2	76	3	0.0000000
5	2	2	77	3	0.0000000
5	2	3	76	3	0.0000000
5	2	3	77	3	0.0000000
5	3	1	76	3	0.0000000
5	3	1	77	3	0.0000000
5	3	2	76	3	0.0833333
5	3	2	77	3	0.0000000
5	3	3	76	3	0.0000000
5	3	3	77	3	0.0000000
5	4	1	76	3	0.0000000
5	4	1	77	3	0.0000000
5	4	2	76	3	0.0000000
5	4	2	77	3	1.7111111
5	4	3	76	3	0.0833333
5	4	3	77	3	1.6666667
5	5	1	76	3	0.0000000
5	5	1	77	3	0.0000000
5	5	2	76	3	0.1111111
5	5	2	77	3	34.2500000
5	5	3	76	3	0.0000000
5	5	3	77	3	0.0000000
6	1	1	76	3	0.0000000
6	1	1	77	3	0.0000000
6	1	2	76	3	0.0000000
6	1	2	77	3	0.0000000
6	1	3	76	3	0.0000000
6	1	3	77	3	13.3333333
6	2	1	76	3	0.0000000
6	2	1	77	3	0.0000000
6	2	2	76	3	0.0000000
6	2	2	77	3	0.0000000
6	2	3	76	3	0.0000000
6	2	3	77	3	0.0666667

STATISTICAL ANALYSIS SYSTEM

SEASON=SPRING

MEANS

SPECIES	FERT	ZONE	YEAR	N	CRAB_B
6	3	1	76	3	0.00000000
6	3	1	77	3	0.00000000
6	3	2	76	3	0.25000000
6	3	2	77	3	0.00000000
6	3	3	76	3	0.66666667
6	3	3	77	3	3.40000000
6	4	1	76	3	0.00000000
6	4	1	77	3	0.00000000
6	4	2	76	3	0.00000000
6	4	2	77	3	0.00000000
6	4	3	76	3	0.00000000
6	4	3	77	3	0.00000000
6	5	1	76	3	0.00000000
6	5	1	77	3	0.00000000
6	5	2	76	3	0.00000000
6	5	2	77	3	0.23333333
6	5	3	76	3	0.00000000
6	5	3	77	3	0.07777778
7	1	1	76	3	0.00000000
7	1	1	77	3	0.00000000
7	1	2	76	3	0.00000000
7	1	2	77	3	0.00000000
7	1	3	76	3	0.00000000
7	1	3	77	3	3.33333333
7	2	1	76	3	0.00000000
7	2	1	77	3	0.00000000
7	2	2	76	3	0.33333333
7	2	2	77	3	0.46666667
7	2	3	76	3	0.77777778
7	2	3	77	3	7.32222222
7	3	1	76	3	0.00000000
7	3	1	77	3	0.00000000
7	3	2	76	3	0.00000000
7	3	2	77	3	6.66666667
7	3	3	76	3	0.00000000
7	3	3	77	3	8.13333333
7	4	1	76	3	0.00000000
7	4	1	77	3	0.00000000
7	4	2	76	3	0.00000000
7	4	2	77	3	0.06666667
7	4	3	76	3	0.00000000
7	4	3	77	3	1.56666667
7	5	1	76	3	0.00000000
7	5	1	77	3	0.00000000
7	5	2	76	3	0.00000000
7	5	2	77	3	0.00000000
7	5	3	76	3	0.00000000
7	5	3	77	3	9.68333333
8	1	1	76	3	0.00000000
8	1	1	77	3	0.00000000
8	1	2	76	3	0.00000000
8	1	2	77	3	0.00000000
8	1	3	76	3	0.00000000
8	1	3	77	3	0.00000000

STATISTICAL ANALYSIS SYSTEM

SEASON=SPRING

MEANS

SPECIES	FERT	ZONE	YEAR	N	CRAB_B
8	2	1	76	3	0.00000000
8	2	1	77	3	0.00000000
8	2	2	76	3	2.00000000
8	2	2	77	3	0.00000000
8	2	3	76	3	0.00000000
8	2	3	77	3	0.00000000
8	3	1	76	3	0.00000000
8	3	1	77	3	0.00000000
8	3	2	76	3	0.00000000
8	3	2	77	3	2.22222222
8	3	3	76	3	0.00000000
8	3	3	77	3	0.00000000
8	4	1	76	3	0.30000000
8	4	1	77	3	0.00000000
8	4	2	76	3	4.50000000
8	4	2	77	3	1.66666667
8	4	3	76	3	0.00000000
8	4	3	77	3	0.06666667
8	5	1	76	3	0.00000000
8	5	1	77	3	0.00000000
8	5	2	76	3	0.00000000
8	5	2	77	3	0.00000000
8	5	3	76	3	0.00000000
8	5	3	77	3	0.03333333

STATISTICAL ANALYSIS SYSTEM

SEASON=SPRING

MEANS

FERT	ZONE	YEAR	N	CRAB_B
1	1	76	24	0.00000000
1	1	77	24	0.00000000
1	2	76	24	0.00000000
1	2	77	24	0.01458333
1	3	76	24	0.02777778
1	3	77	24	2.12916667
2	1	76	24	0.00000000
2	1	77	24	0.00000000
2	2	76	24	0.29166667
2	2	77	24	1.17916667
2	3	76	24	0.09722222
2	3	77	24	2.17361111
3	1	76	24	0.00000000
3	1	77	24	0.00000000
3	2	76	24	0.06250000
3	2	77	24	1.12500000
3	3	76	24	0.32291667
3	3	77	24	3.99305556
4	1	76	24	0.00000000
4	1	77	24	0.00000000
4	2	76	24	0.60416667
4	2	77	24	0.43055556
4	3	76	24	0.03125000
4	3	77	24	0.92361111
5	1	76	24	0.00000000
5	1	77	24	0.00000000
5	2	76	24	0.01388889
5	2	77	24	4.31875000
5	3	76	24	0.00000000
5	3	77	24	3.48541667

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

SEASON=SPRING

MEANS

SPECIES	ZONE	YEAR	N	CRAB_R
1	1	76	15	0.00000000
1	1	77	15	0.00000000
1	2	76	15	0.00000000
1	2	77	15	0.22222222
1	3	76	15	0.00000000
1	3	77	15	2.34000000
2	1	76	15	0.00000000
2	1	77	15	0.30000000
2	2	76	15	0.10000000
2	2	77	15	0.26000000
2	3	76	15	0.00000000
2	3	77	15	7.59111111
3	1	76	15	0.00000000
3	1	77	15	0.00000000
3	2	76	15	0.00000000
3	2	77	15	1.33333333
3	3	76	15	0.00000000
3	3	77	15	0.34666667
4	1	76	15	0.00000000
4	1	77	15	0.00000000
4	2	76	15	0.00000000
4	2	77	15	0.01333333
4	3	76	15	3.41666667
4	3	77	15	0.28444444
5	1	76	15	0.00000000
5	1	77	15	0.00000000
5	2	76	15	0.03888889
5	2	77	15	7.21555556
5	3	76	15	0.06111111
5	3	77	15	0.36222222
6	1	76	15	0.00000000
6	1	77	15	0.00000000
6	2	76	15	0.05000000
6	2	77	15	0.04666667
6	3	76	15	0.13333333
6	3	77	15	3.37555556
7	1	76	15	0.00000000
7	1	77	15	0.00000000
7	2	76	15	0.06666667
7	2	77	15	1.44000000
7	3	76	15	3.15555556
7	3	77	15	6.00777778
8	1	76	15	0.00000000
8	1	77	15	0.00000000
8	2	76	15	1.30000000
8	2	77	15	3.77777778
8	3	76	15	0.00000000
8	3	77	15	0.02000000

STATISTICAL ANALYSIS SYSTEM

SEASON=SPRING

MEANS

ZONE	YEAR	N	CRAB_8
1	76	120	0.0000000
1	77	120	0.0000000
2	76	120	0.1944444
2	77	120	1.4136111
3	76	120	0.0958333
3	77	120	2.5409722

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

SEASON=SPRING

MEANS

SPECIES	FERT	YEAR	N	CRAB_B
1	1	76	9	0.0000000
1	1	77	9	0.0000000
1	2	76	9	0.0000000
1	2	77	9	0.3703704
1	3	76	9	0.0000000
1	3	77	9	0.3814815
1	4	76	9	0.0000000
1	4	77	9	0.0000000
1	5	76	9	0.0000000
1	5	77	9	3.5185185
2	1	76	9	0.0000000
2	1	77	9	0.0740741
2	2	76	9	0.0000000
2	2	77	9	3.3597593
2	3	76	9	0.0555556
2	3	77	9	5.9925926
2	4	76	9	0.1111111
2	4	77	9	1.3555556
2	5	76	9	0.0000000
2	5	77	9	2.3037037
3	1	76	9	0.0000000
3	1	77	9	0.0000000
3	2	76	9	0.0000000
3	2	77	9	2.5925926
3	3	76	9	0.0000000
3	3	77	9	0.0000000
3	4	76	9	0.0000000
3	4	77	9	0.0000000
3	5	76	9	0.0000000
3	5	77	9	0.2074074
4	1	76	9	0.0000000
4	1	77	9	0.0000000
4	2	76	9	0.0000000
4	2	77	9	0.0000000
4	3	76	9	0.6388889
4	3	77	9	0.4666667
4	4	76	9	0.0555556
4	4	77	9	0.0074074
4	5	76	9	0.0000000
4	5	77	9	0.0222222
5	1	76	9	0.0740741
5	1	77	9	0.0870370
5	2	76	9	0.0000000
5	2	77	9	0.0000000
5	3	76	9	0.0277778
5	3	77	9	0.0000000
5	4	76	9	0.0277778
5	4	77	9	1.1259259
5	5	76	9	0.0370370
5	5	77	9	11.4166667
6	1	76	9	0.0000000
6	1	77	9	4.4444444
6	2	76	9	0.0000000
6	2	77	9	0.0222222

STATISTICAL ANALYSIS SYSTEM

SEASON=SPRING

MEANS

SPECIES	FERT	YEAR	N	CRAB_B
6	3	76	9	0.30555556
6	3	77	9	1.13333333
6	4	76	9	0.00000000
6	4	77	9	0.00000000
6	5	76	9	0.00000000
6	5	77	9	0.10370370
7	1	76	9	0.00000000
7	1	77	9	1.11111111
7	2	76	9	0.37037037
7	2	77	9	2.59629630
7	3	76	9	0.00000000
7	3	77	9	4.93333333
7	4	76	9	0.00000000
7	4	77	9	0.54444444
7	5	76	9	0.00000000
7	5	77	9	3.22777778
8	1	76	9	0.00000000
8	1	77	9	0.00000000
8	2	76	9	0.66666667
8	2	77	9	0.00000000
8	3	76	9	0.00000000
8	3	77	9	0.74074074
8	4	76	9	1.50000000
8	4	77	9	0.57777778
8	5	76	9	0.00000000
8	5	77	9	0.01111111

FERT	YEAR	N	CRAB_B
1	76	72	0.00925926
1	77	72	0.71458333
2	76	72	0.12962963
2	77	72	1.11759259
3	76	72	0.12847222
3	77	72	1.70601852
4	76	72	0.21180556
4	77	72	0.45138889
5	76	72	0.00462963
5	77	72	2.60138889

STATISTICAL ANALYSIS SYSTEM

SEASON=SPRING

MEANS

SPECIES	YEAR	N	CRAB_B
1	76	45	0.00000000
1	77	45	0.85407407
2	76	45	0.03333333
2	77	45	2.61703704
3	76	45	0.00000000
3	77	45	0.56000000
4	76	45	0.13888889
4	77	45	0.09925926
5	76	45	0.03333333
5	77	45	2.52592593
6	76	45	0.06111111
6	77	45	1.14074074
7	76	45	0.07407407
7	77	45	2.48259259
8	76	45	0.43333333
8	77	45	0.26592593

YEAR	N	CRAB_B
76	360	0.09675926
77	360	1.31819444

STATISTICAL ANALYSIS SYSTEM

SEASON=SPRING

MEANS

SPECIES	FERT	ZONE	N	CRAB_B
1	1	1	6	0.00000000
1	1	2	6	0.00000000
1	1	3	6	0.00000000
1	2	1	6	0.00000000
1	2	2	6	0.55555556
1	2	3	6	0.00000000
1	3	1	6	0.00000000
1	3	2	6	0.00000000
1	3	3	6	0.57222222
1	4	1	6	0.00000000
1	4	2	6	0.00000000
1	4	3	6	0.00000000
1	5	1	6	0.00000000
1	5	2	6	0.00000000
1	5	3	6	5.27777778
2	1	1	6	0.00000000
2	1	2	6	0.00000000
2	1	3	6	0.11111111
2	2	1	6	0.00000000
2	2	2	6	0.59444444
2	2	3	6	4.44444444
2	3	1	6	0.00000000
2	3	2	6	0.13888889
2	3	3	6	8.93333333
2	4	1	6	0.00000000
2	4	2	6	0.16666667
2	4	3	6	2.03333333
2	5	1	6	0.00000000
2	5	2	6	0.00000000
2	5	3	6	3.45555556
3	1	1	6	0.00000000
3	1	2	6	0.00000000
3	1	3	6	0.00000000
3	2	1	6	0.00000000
3	2	2	6	3.33333333
3	2	3	6	0.55555556
3	3	1	6	0.00000000
3	3	2	6	0.00000000
3	3	3	6	0.00000000
3	4	1	6	0.00000000
3	4	2	6	0.00000000
3	4	3	6	0.00000000
3	5	1	6	0.00000000
3	5	2	6	0.00000000
3	5	3	6	0.31111111
4	1	1	6	0.00000000
4	1	2	6	0.00000000
4	1	3	6	0.00000000
4	2	1	6	0.00000000
4	2	2	6	0.00000000
4	2	3	6	0.00000000
4	3	1	6	0.00000000
4	3	2	6	0.00000000
4	3	3	6	1.65833333

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

SEASON=SPRING

MEANS

SPECIES	FERT	ZONE	N	CRAB_B
4	4	1	6	0.0000000
4	4	2	6	0.0000000
4	4	3	6	0.0944444
4	5	1	6	0.0000000
4	5	2	6	0.0333333
4	5	3	6	0.0000000
5	1	1	6	0.0000000
5	1	2	6	0.0583333
5	1	3	6	0.1833333
5	2	1	6	0.0000000
5	2	2	6	0.0000000
5	2	3	6	0.0000000
5	3	1	6	0.0000000
5	3	2	6	0.0416667
5	3	3	6	0.0000000
5	4	1	6	0.0000000
5	4	2	6	0.8555556
5	4	3	6	0.8750000
5	5	1	6	0.0000000
5	5	2	6	17.1805556
5	5	3	6	0.0000000
6	1	1	6	0.0000000
6	1	2	6	0.0000000
6	1	3	6	6.6666667
6	2	1	6	0.0000000
6	2	2	6	0.0000000
6	2	3	6	0.0333333
6	3	1	6	0.0000000
6	3	2	6	0.1250000
6	3	3	6	2.0333333
6	4	1	6	0.0000000
6	4	2	6	0.0000000
6	4	3	6	0.0000000
6	5	1	6	0.0000000
6	5	2	6	0.1166667
6	5	3	6	0.0388889
7	1	1	6	0.0000000
7	1	2	6	0.0000000
7	1	3	6	1.6666667
7	2	1	6	0.0000000
7	2	2	6	0.4000000
7	2	3	6	4.0500000
7	3	1	6	0.0000000
7	3	2	6	3.3333333
7	3	3	6	4.0666667
7	4	1	6	0.0000000
7	4	2	6	0.3333333
7	4	3	6	0.7833333
7	5	1	6	0.0000000
7	5	2	6	0.0000000
7	5	3	6	4.8416667
8	1	1	6	0.0000000
8	1	2	6	0.0000000
8	1	3	6	0.0000000

STATISTICAL ANALYSIS SYSTEM

SEASON=SPRING

MEANS

SPECIES	FERT	ZONE	N	CRAB_B
8	2	1	6	0.00000000
8	2	2	6	1.00000000
8	2	3	6	0.00000000
8	3	1	6	0.00000000
8	3	2	6	1.11111111
8	3	3	6	0.00000000
8	4	1	6	0.00000000
8	4	2	6	3.08333333
8	4	3	6	0.03333333
8	5	1	6	0.00000000
8	5	2	6	0.00000000
8	5	3	6	0.01666667

FERT	ZONE	N	CRAB_B
1	1	48	0.00000000
1	2	48	0.00729167
1	3	48	1.07847222
2	1	48	0.00000000
2	2	48	0.73541667
2	3	48	1.13541667
3	1	48	0.00000000
3	2	48	0.59375000
3	3	48	2.15798611
4	1	48	0.00000000
4	2	48	0.51736111
4	3	48	0.41743056
5	1	48	0.00000000
5	2	48	2.16631944
5	3	48	1.74270833

STATISTICAL ANALYSIS SYSTEM

SEASON=SPRING

MEANS

SPECIES	ZONE	N	CRAB_B
1	1	30	0.00000000
1	2	30	0.11111111
1	3	30	1.17000000
2	1	30	0.00000000
2	2	30	0.18000000
2	3	30	3.79555556
3	1	30	0.00000000
3	2	30	0.66666667
3	3	30	0.17333333
4	1	30	0.00000000
4	2	30	0.00066667
4	3	30	0.35055556
5	1	30	0.00000000
5	2	30	3.62722222
5	3	30	0.21166667
6	1	30	0.00000000
6	2	30	0.04833333
6	3	30	1.75444444
7	1	30	0.00000000
7	2	30	0.75333333
7	3	30	3.08166667
8	1	30	0.00000000
8	2	30	1.03888889
8	3	30	0.01000000

ZONE	N	CRAB_B
1	240	0.00000000
2	240	0.80402778
3	240	1.31840278

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S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

SEASON=SPRING

MEANS

SPECIES	FERT	N	CRAB_B
1	1	18	0.00000000
1	2	18	0.18518519
1	3	18	0.19074074
1	4	18	0.00000000
1	5	18	1.75925926
2	1	18	0.03703704
2	2	18	1.67962963
2	3	18	3.02407407
2	4	18	3.73333333
2	5	18	1.15185185
3	1	18	0.00000000
3	2	18	1.29629630
3	3	18	0.00000000
3	4	18	0.00000000
3	5	18	0.10370370
4	1	18	0.00000000
4	2	18	0.00000000
4	3	18	0.55277778
4	4	18	0.03148148
4	5	18	0.01111111
5	1	18	0.08055556
5	2	18	0.00000000
5	3	18	0.01388889
5	4	18	0.57685185
5	5	18	5.72685185
6	1	18	2.22222222
6	2	18	0.01111111
6	3	18	0.71944444
6	4	18	0.00000000
6	5	18	0.05185185
7	1	18	0.55555556
7	2	18	1.48333333
7	3	18	2.46666667
7	4	18	0.27222222
7	5	18	1.61388889
8	1	18	0.00000000
8	2	18	0.33333333
8	3	18	0.37037037
8	4	18	1.03888889
8	5	18	0.30555556

FERT	N	CRAB_B
1	144	0.36192130
2	144	0.62361111
3	144	0.91724537
4	144	0.33159722
5	144	1.30300926

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

SEASON=SPRING

MEANS

SPECIES	N	CRAB_B
1	90	0.42703704
2	90	1.32518519
3	90	0.28300000
4	90	0.11907407
5	90	1.27962963
6	90	0.63392593
7	90	1.27833333
8	90	0.34962963
OVERALL MEANS	720	0.70747685

STATISTICAL ANALYSIS SYSTEM

SEASON=SPRING

ANALYSIS OF VARIANCE FOR VARIABLE GRAB_H MEAN 0.707476852 C.V. 714.614068 %

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	LSD .01	LSD .05	DIVISOR
REP	2	300.8588	150.429403			
ZONE	2	211.9383	105.969128			
ERROR A	4	154.2466	38.561650	2.60934530	1.57387447	240
YEAR	1	268.5427	268.542704			
ZONE*YEAR	2	179.3616	89.680794			
ERROR B	6	306.7198	51.119971			
SPECIES	7	160.3627	22.908960			
FERT	4	95.9601	23.990014			
SPECIES*FERT	28	646.7247	23.097312			
SPECIES*ZONE	14	582.6072	41.614799			
FERT*ZONE	8	110.6775	13.834689			
SPECIES*FERT*ZONE	56	1352.8750	24.158482			
ERROR C	234	5995.6510	25.622440			
SPECIES*YEAR	7	202.3315	28.904500			
FERT*YEAR	4	118.9168	29.729200			
SPECIES*FERT*YEAR	28	612.1235	21.861555			

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STATISTICAL ANALYSIS SYSTEM

SEASON=SPRING

ANALYSIS OF VARIANCE FOR VARIABLE CRAB_B MEAN 0.707476852 C.V. 714.614068 %

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	LSD .01	LSD .05	DIVISOR
SPECIES*ZONE*YEAR	14	576.8097	41.200690			
FERT*ZONE*YEAR	8	100.6228	12.577856			
SPECIES*FERT*ZONE*YEAR	56	1329.0174	23.732454			
ERROR D	234	5981.1329	25.560397			
LSD_SPECIES	234	5995.6510	25.622440	1.95962143	1.48664951	90
LSD_FERT	234	5995.6510	25.622440	1.54921627	1.17529964	144
LSD_SP*F	234	5995.6510	25.622440	4.38184547	3.32424831	18
LSD_SP*Z	234	5995.6510	25.622440	3.39416409	2.57495213	30
LSD_SP*Y	234	5981.1329	25.560397	2.76796436	2.09989166	45
RESIDUAL	234	5981.1329	25.560397			
CORRECTED TOTAL	719	19287.4806	26.825425			

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB > F
NUMERATOR:	YEAR	1	268.5427	268.542704	5.25319	0.0604
DENOMINATOR:	ERROR B	6	306.7198	51.119971		
NUMERATOR:	ZONE*YEAR	2	179.3616	89.680794	1.75432	0.2510
DENOMINATOR:	ERROR B	6	306.7198	51.119971		
NUMERATOR:	SPECIES	7	160.3627	22.908960	0.89410	0.5127
DENOMINATOR:	ERROR C	234	5995.6510	25.622440		
NUMERATOR:	FERT	4	95.9601	23.990014	0.93629	0.5549
DENOMINATOR:	ERROR C	234	5995.6510	25.622440		

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

SEASON=SPRING

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB > F
NUMERATOR:	SPECIES*FERT	28	646.7247	23.097312	0.90145	0.6130
DENOMINATOR:	ERROR C	234	5995.6510	25.622440		
NUMERATOR:	SPECIES*ZONE	14	582.6072	41.614799	1.62415	0.0734
DENOMINATOR:	ERROR C	234	5995.6510	25.622440		
NUMERATOR:	FERT*ZONE	8	110.6775	13.834689	0.53994	0.8266
DENOMINATOR:	ERROR C	234	5995.6510	25.622440		
NUMERATOR:	SPECIES*FERT*ZONE	56	1352.8750	24.158482	0.94286	0.5926
DENOMINATOR:	ERROR C	234	5995.6510	25.622440		
NUMERATOR:	SPECIES*YEAR	7	202.3315	28.904500	1.13083	0.3440
DENOMINATOR:	ERROR D	234	5981.1329	25.560397		
NUMERATOR:	FERT*YEAR	4	118.9168	29.729200	1.16310	0.3274
DENOMINATOR:	ERROR D	234	5981.1329	25.560397		
NUMERATOR:	SPECIES*FERT*YEAR	28	612.1235	21.861555	0.85529	0.6798
DENOMINATOR:	ERROR D	234	5981.1329	25.560397		

PART 2

STATISTICAL ANALYSIS SYSTEM

6:53 THURSDAY, DECEMBER 22, 1977 [2]

SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: COND

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	125	2339.92281637	18.71938253	11.64	0.0001	0.444211	142.7831
ERROR	1821	2927.66834952	1.60772562		STD DEV		COND MEAN
CORRECTED TOTAL	1946	5267.59116590			1.26796171		0.88803287

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
REP	2	28.10867893	8.74	0.0002	2	34.48017544	10.72	0.0001
ZONE	2	1020.05074456	317.23	0.0001	2	1137.05319695	353.62	0.0001
REP*ZONE	4	15.82648757	2.46	0.0435	4	17.49575479	2.72	0.0282
SPECIES	7	659.57153934	58.61	0.0001	7	723.51439954	64.29	0.0001
FERT	4	5.41440738	0.84	0.4985	4	6.73063315	1.05	0.3817
SPECIES*FERT	28	34.23886701	0.76	0.8116	28	33.39448591	0.74	0.8336
ZONE*SPECIES	14	484.26444331	21.52	0.0001	14	482.03853819	21.42	0.0001
ZONE*FERT	8	12.44596819	0.97	0.4595	8	12.34473664	0.96	0.4659
ZONE*SPECIES*FERT	55	80.00168005	0.89	0.7069	56	80.00168705	0.89	0.7058

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STATISTICAL ANALYSIS SYSTEM

SEASON=SPRING

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: COND

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	125	2254.70927136	18.03767417	12.34	0.0001	0.415441	187.3990
ERROR	2171	3172.56108127	1.46133629		STD DEV		COND MEAN
CORRECTED TOTAL	2296	5427.27035263			1.20885743		0.64331253

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
REP	2	54.32631059	18.59	0.0001	2	68.75411303	23.52	0.0001
ZONE	2	897.88011372	307.21	0.0001	2	964.67447231	330.07	0.0001
REP*ZONE	4	23.30690015	3.99	0.0032	4	25.04291590	4.28	0.0019
SPECIES	7	482.99642853	47.22	0.0001	7	518.27165314	50.67	0.0001
FERT	4	3.86778042	0.66	0.6186	4	4.22275776	0.72	0.5756
SPECIES*FERT	28	82.23932084	2.01	0.0013	28	83.32597842	2.04	0.0011
ZONE*SPECIES	14	578.05788816	28.25	0.0001	14	580.04519303	28.35	0.0001
ZONE*FERT	8	14.47206209	1.24	0.2725	8	13.87574387	1.19	0.3028
ZONE*SPECIES*FERT	56	117.56196684	1.44	0.0195	56	117.56196684	1.44	0.0195

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STATISTICAL ANALYSIS SYSTEM   5:38 THURSDAY, DECEMBER 22, 1977 4

SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: BASAL_AR

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	125	1492.13908640	11.93711269	5.44	0.0001	0.552402	167.7918
ERROR	551	1209.04618303	2.19427619		STD DEV		BASAL_AR MEAN
CORRECTED TOTAL	676	2701.18526943			1.48130895		0.88292570

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
REP	2	10.77566792	2.45	0.0868	2	13.83037577	3.15	0.0436
ZONE	2	498.92297937	113.69	0.0001	2	442.27044048	100.78	0.0001
REP*ZONE	4	21.82841523	2.49	0.0426	4	18.67423605	2.13	0.0751
SPECIES	7	350.73909367	22.83	0.0001	7	343.62988630	22.37	0.0001
FERT	4	20.43558046	2.33	0.0551	4	21.98593665	2.50	0.0413
SPECIES*FERT	28	79.88577949	1.33	0.1406	28	76.54259193	1.25	0.1814
ZONE*SPECIES	14	310.59166520	10.11	0.0001	14	307.53293398	10.01	0.0001
ZONE*FERT	8	48.56889354	2.77	0.0053	9	43.15513115	2.45	0.0127
ZONE*SPECIES*FERT	56	150.39101152	1.22	0.1357	56	150.39101152	1.22	0.1357

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SEASON=SPRING

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: BASAL_AR

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	125	1382.72540365	11.06180723	6.66	0.0001	0.492001	179.8501
ERROR	860	1427.68692730	1.66010108		STD DEV		BASAL_AR MEAN
CORRECTED TOTAL	985	2810.41233096			1.28844910		0.71649152

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
REP	2	40.53932423	12.21	0.0001	2	41.89745749	12.62	0.0001
ZONE	2	478.69183694	144.13	0.0001	2	449.11744251	135.27	0.0001
REP*ZONE	4	27.52984129	4.15	0.0025	4	22.30991195	3.36	0.0097
SPECIES	7	329.06953116	28.32	0.0001	7	370.06323777	31.85	0.0001
FERT	4	10.89439150	1.64	0.1620	4	8.34520322	1.26	0.2854
SPECIES*FERT	28	94.38123472	2.03	0.0013	28	91.21396802	1.96	0.0022
ZONE*SPECIES	14	282.50172408	12.16	0.0001	14	284.93207621	12.26	0.0001
ZONE*FERT	8	9.52751092	0.72	0.6763	8	8.79262442	0.66	0.7252
ZONE*SPECIES*FERT	56	109.59050882	1.18	0.1786	56	109.59050882	1.18	0.1786

STATISTICAL ANALYSIS SYSTEM　　5:53 THURSDAY, DECEMBER 22, 1977　2

SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: SHOOT HT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	125	154009.56166076	1232.07649329	7.79	0.0001	0.381871	180.1401
ERROR	1576	249292.87370940	158.18075743		STD DEV		SHOOT_HT MEAN
CORRECTED TOTAL	1701	403302.43537015			12.57699318		6.98178613

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
REP	2	2872.03194659	9.08	0.0001	2	3305.33833690	10.45	0.0001
ZONE	2	62839.97914746	198.53	0.0001	2	63091.68306773	199.43	0.0001
REP*ZONE	4	1549.75497080	2.45	0.0445	4	1465.22129979	2.32	0.0553
SPECIES	7	34601.87558214	31.25	0.0001	7	35050.08696818	31.65	0.0001
FERT	4	1543.79757432	2.44	0.0451	4	1597.48498165	2.52	0.0392
SPECIES*FERT	28	4823.60479369	1.09	0.3470	28	4872.34377068	1.10	0.3280
ZONE*SPECIES	14	33414.68693714	15.09	0.0001	14	33538.79922064	15.14	0.0001
ZONE*FERT	8	2696.26600862	2.13	0.0303	8	2673.01572385	2.11	0.0318
ZONE*SPECIES*FERT	56	9668.56485000	1.09	0.3012	56	9668.56485000	1.09	0.3012

1

STATISTICAL ANALYSIS SYSTEM 5:38 THURSDAY, DECEMBER 22, 1977 2

SEASON=SPRING 1976

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: SHOOT_HT

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	125	93474.57943752	747.79663550	10.57	0.0001	0.514818	149.7733
ERROR	1245	88093.61458144	70.75792336		STD DEV		SHOOT_HT MEAN
CORRECTED TOTAL	1370	181568.19401896			8.41177290		5.61633864

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
REP	2	2293.18544080	16.20	0.0001	2	2472.68442232	17.47	0.0001
ZONE	2	41863.73449787	295.82	0.0001	2	42738.25433268	302.00	0.0001
REP*ZONE	4	1159.11120424	4.13	0.0025	4	1189.51906961	4.20	0.0022
>SPECIES	7	18728.40831671	37.81	0.0001	7	18714.62381879	37.78	0.0001
FERT	4	1110.42215044	3.92	0.0036	4	949.32622652	3.35	0.0097
SPECIES*FERT	28	4319.41340813	2.13	0.0004	28	4391.61067277	2.22	0.0003
>ZONE*SPECIES	14	17157.96753165	17.32	0.0001	14	17414.09151696	17.58	0.0001
ZONE*FERT	8	984.77308515	1.74	0.0851	8	903.41096758	1.60	0.1214
ZONE*SPECIES*FERT	55	5847.56383253	1.43	0.0141	56	5847.56380253	1.48	0.0141

→ Effects plot sp × zone

→ ... species × zone

* suitable ... species zone

1

C98

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   6:25 THURSDAY, DECEMBER 22, 1977   2

SEASON=SPRING

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: FL_STM

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	125	16237.26340278	129.89810722	1.23	0.0613	0.205493	1682.6410
ERROR	594	62778.69991667	105.68804700		STD DEV		FL_STM MEAN
CORRECTED TOTAL	719	79015.96331944			10.28046920		0.61097222

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
REP	2	313.69169444	1.43	0.2276	2	313.69169444	1.48	0.2276
ZONE	2	537.53336111	2.54	0.0795	2	537.53336111	2.54	0.0795
REP*ZONE	4	627.38338889	1.48	0.2055	4	627.38338889	1.48	0.2055
SPECIES	7	1881.36676389	2.54	0.0139	7	1881.36676389	2.54	0.0139
FERT	4	379.77311111	0.90	0.4645	4	379.77311111	0.90	0.4665
SPECIES*FERT	28	2658.41177778	0.90	0.6195	28	2658.41177778	0.90	0.6195
ZONE*SPECIES	14	3762.73352778	2.54	0.0015	14	3762.73352778	2.54	0.0015
ZONE*FERT	8	759.54622222	0.93	0.5174	8	759.54622222	0.90	0.5174
ZONE*SPECIES*FERT	56	5316.82355556	0.90	0.6842	56	5316.82355556	0.90	0.5842

1

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   5:53 THURSDAY, DECEMBER 22, 1977

SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: FL_STM

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	125	88353.58348148	706.82866785	1.10	0.2136	0.063426	1698.2878
ERROR	2034	1304672.17288889	641.43174675		STD DEV		FL_STM MEAN
CORRECTED TOTAL	2159	1393025.75637037			25.32650295		1.49129630

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
REP	2	5680.25600926	4.43	0.0121	2	5680.25600926	4.43	0.0121
ZONE	2	6900.76670370	5.38	0.0047	2	6900.76670370	5.38	0.0047
REP*ZONE	4	8272.11999074	3.22	0.0120	4	8272.11999074	3.22	0.0120
SPECIES	7	10769.88755556	2.40	0.0192	7	10769.88755556	2.40	0.0192
FERT	4	1943.18817593	0.77	0.5793	4	1943.18817593	0.77	0.5793
SPECIES*FERT	28	9126.48730556	0.51	0.9852	28	9126.48730556	0.51	0.9852
ZONE*SPECIES	14	23520.33122222	2.62	0.0009	14	23520.33122222	2.62	0.0009
ZONE*FERT	8	3569.18482407	0.70	0.6958	8	3569.18482407	0.70	0.6958
ZONE*SPECIES*FERT	56	18671.36169444	0.52	0.9987	56	18671.36169444	0.52	0.9987

1

C100

STATISTICAL ANALYSIS SYSTEM 6:25 THURSDAY, DECEMBER 22, 1977 4

SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: SURVIVAL

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	125	1272603.40499169	10180.82723993	5.17	0.0001	0.526032	179.4962
ERROR	582	1146648.52721170	1970.18647287		STD DEV		SURVIVAL MEAN
CORRECTED TOTAL	707	2419251.93220339			44.38678264		24.72881356

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
REP	2	9660.71433391	2.45	0.0870	2	8940.18281059	2.77	0.1043
ZONE	2	308648.80961837	78.33	0.0001	2	306138.32813021	77.69	0.0001
REP*ZONE	4	10922.36264728	1.39	0.2374	4	11014.82086783	1.40	0.2333
SPECIES	7	233963.24546880	16.95	0.0001	7	231854.71705352	15.81	0.0001
FERT	4	16251.70827420	2.05	0.0844	4	15182.46830933	1.93	0.1045
SPECIES*FERT	28	69915.74266917	1.27	0.1639	28	66768.13054148	1.21	0.2120
ZONE*SPECIES	14	434310.79426410	15.75	0.0001	14	433893.31695529	15.73	0.0001
ZONE*FERT	8	41912.87035546	2.65	0.0071	8	41720.04927210	2.65	0.0074
ZONE*SPECIES*FERT	56	147017.15736040	1.33	0.0592	55	147017.15736040	1.33	0.0592

1

SEASON=FALL   SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
REP	3	1 2 3
ZONE	3	1 2 3
SPECIES	7	1 2 3 4 5 6 7
FERT	5	1 2 3 4 5

NUMBER OF OBSERVATIONS IN BY GROUP = 2835

GROUP	OBS	DEPENDENT VARIABLES
1	358	RT_BIO
2	860	AIR_B

NOTE: VARIABLES IN EACH GROUP ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES.

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   21:10 MONDAY, APRIL 17, 1978   2

SEASON=FALL   SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: FT_BIO

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	110	81136598.31019714	737605.43918361	2.45	0.0001	0.264822	427.77[illegible]
ERROR	747	225244621.02552536	301532.29052949		STD DEV		RT_BIO MEAN
CORRECTED TOTAL	857	306381219.33572250			549.11955941		128.[illegible]771562

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
REP	2	516323.37213763	0.86	0.4252	2	470225.08880112	0.78	0.4579
ZONE	2	24589959.36069993	40.78	0.0001	2	22437912.25229729	37.21	0.0001
REP*ZONE	4	594951.58425194	0.49	0.7407	4	470364.83139322	0.39	0.8159
SPECIES	6	8409259.53364390	4.65	0.0001	6	7719206.44275350	4.27	0.0003
FERT	4	1183389.52367156	0.98	0.4170	4	1188868.77676145	0.99	0.4145
SPECIES*FERT	24	7835014.73768994	1.08	0.3574	24	8020055.83703166	1.11	0.3274
ZONE*SPECIES	12	18873659.94700349	5.22	0.0001	12	16601981.02324419	4.59	0.0001
ZONE*FERT	8	2768002.95376797	1.15	0.3289	8	3144135.72848311	1.30	0.2383
ZONE*SPECIES*FERT	48	16366037.29733081	1.13	0.2562	48	16366037.29733079	1.13	0.2562

C103

SEASON=FALL   SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE RT_BIO

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=747   MS=301532

GROUPING	MEAN	N	REP
A	153.404000	275	1
A			
A	138.187413	286	2
A			
A	95.729966	297	3

C104

SEASON=FALL   SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE PT_?10

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=747   MS=301532

GROUPING	MEAN	N	ZONE
A	378.199630	270	3
B	16.168070	285	2
B			
B	11.279538	303	1

C105

SEASON=FALL SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

MEANS

REP	ZONE	N	RT_BIO
1	1	100	33.847000
1	2	91	18.767033
1	3	84	441.590476
2	1	100	0.330000
2	2	92	17.643478
2	3	94	402.823404
3	1	103	0.000000
3	2	102	12.518627
3	3	92	295.161957

C106

SEASON=FALL   SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE RT_RTO

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=747   MS=301532

GROUPING	MEAN	N	SPECIES
A	358.635714	126	7
B	144.695495	111	5
B	124.042017	119	4
B	102.626772	127	2
B	74.466142	127	1
B	56.864754	122	6
B	37.398730	126	3

SEASON=FALL   SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE RT_BIO

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=747   MS=301532

GROUPING	MEAN	N	FERT
A	181.518563	167	5
A			
A	165.705814	172	3
A			
A	111.083721	172	4
A			
A	96.659659	176	2
A			
A	88.923977	171	1

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SEASON=FALL   SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

MEANS

SPECIES	FERT	N	RT_DIO
1	1	26	107.519231
1	2	26	67.542308
1	3	25	152.244000
1	4	25	16.092000
1	5	25	27.988000
2	1	25	42.700000
2	2	27	157.874074
2	3	24	39.466667
2	4	24	161.125000
2	5	27	107.011111
3	1	26	12.038462
3	2	26	2.138462
3	3	25	0.000000
3	4	26	18.703846
3	5	23	167.217391
4	1	24	208.366667
4	2	23	72.956522
4	3	24	37.291667
4	4	24	115.012500
4	5	24	184.454167
5	1	23	119.021739
5	2	23	91.069565
5	3	23	49.556522
5	4	24	67.783333
5	5	18	470.138889
6	1	24	57.362500
6	2	25	62.496000
6	3	24	106.216667
6	4	25	20.560000
6	5	24	38.966667
7	1	23	83.260870
7	2	26	215.492308
7	3	27	709.761481
7	4	24	393.737500
7	5	26	348.326923

ZONE	SPECIES	N	RT_DIO
1	1	45	0.00000
1	2	45	0.00000
1	3	45	0.00000
1	4	42	0.00000
1	5	36	94.93611
1	6	45	0.00000
1	7	45	0.00000
2	1	42	11.47619
2	2	40	7.14250
2	3	45	11.06667

C109

STATISTICAL ANALYSIS SYSTEM 21:10 MONDAY, APRIL 17, 1978 5

SEASON=FALL SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

MEANS

ZONE	SPECIES	N	RT_BIO
2	4	41	0.00000
2	5	39	90.26410
2	6	38	0.00000
2	7	40	1.67250
3	1	40	224.36000
3	2	42	308.28333
3	3	36	117.99722
3	4	36	410.02778
3	5	36	253.42222
3	6	39	177.88462
3	7	41	1100.51707

ZONE	FERT	N	RT_BIO
1	1	61	32.322951
1	2	60	23.550000
1	3	62	0.532258
1	4	62	0.000000
1	5	58	0.000000
2	1	58	10.453448
2	2	58	19.850000
2	3	57	20.110526
2	4	55	18.707273
2	5	57	11.843860
3	1	52	242.846154
3	2	58	249.100000
3	3	53	515.511321
3	4	55	528.681818
3	5	52	569.971154

ZONE	SPECIES	FERT	N	RT_BIO
1	1	1	9	0.00000
1	1	2	9	0.00000
1	1	3	9	0.00000
1	1	4	9	0.00000
1	1	5	9	0.00000
1	2	1	9	0.00000
1	2	2	9	0.00000
1	2	3	9	0.00000
1	2	4	9	0.00000
1	2	5	9	0.00000
1	3	1	9	0.00000
1	3	2	9	0.00000
1	3	3	9	0.00000
1	3	4	9	0.00000
1	3	5	9	0.00000

C110

SEASON=FALL   SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

MEANS

ZONE	SPECIES	FERT	N	RT_610
1	4	1	8	0.00000
1	4	2	8	0.00000
1	4	3	8	0.00000
1	4	4	9	0.00000
1	4	5	9	0.00000
1	5	1	8	246.46250
1	5	2	7	201.85714
1	5	3	9	3.66667
1	5	4	8	0.00000
1	5	5	4	0.00000
1	6	1	9	0.00000
1	6	2	9	0.00000
1	6	3	9	0.00000
1	6	4	9	0.00000
1	6	5	9	0.00000
1	7	1	9	0.00000
1	7	2	9	0.00000
1	7	3	9	0.00000
1	7	4	9	0.00000
1	7	5	9	0.00000
2	1	1	9	0.00000
2	1	2	8	60.25000
2	1	3	8	0.00000
2	1	4	8	0.00000
2	1	5	9	0.00000
2	2	1	8	0.00000
2	2	2	9	5.11111
2	2	3	7	5.67143
2	2	4	7	0.00000
2	2	5	9	0.00000
2	3	1	9	0.00000
2	3	2	9	0.00000
2	3	3	9	0.00000
2	3	4	9	50.33333
2	3	5	9	0.00000
2	4	1	9	0.00000
2	4	2	8	0.00000
2	4	3	9	0.00000
2	4	4	7	0.00000
2	4	5	8	0.00000
2	5	1	9	67.36667
2	5	2	8	69.55000
2	5	3	8	158.32500
2	5	4	8	71.98750
2	5	5	6	112.51667
2	6	1	6	0.00000
2	6	2	8	0.00000
2	6	3	7	0.00000
2	6	4	9	0.00000

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   21:10 MONDAY, APRIL 17, 1978   11

SEASON=FALL   SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

MEANS

ZONE	SPECIES	FERT	N	RT_BIO
2	6	5	8	0.00000
2	7	1	8	0.00000
2	7	2	8	8.36250
2	7	3	9	0.00000
2	7	4	7	0.00000
2	7	5	8	0.00000
3	1	1	8	349.43750
3	1	2	9	141.56667
3	1	3	8	475.76250
3	1	4	8	50.28750
3	1	5	7	99.60000
3	2	1	8	133.43750
3	2	2	9	468.51111
3	2	3	8	113.43750
3	2	4	8	483.37500
3	2	5	9	321.03333
3	3	1	8	39.12500
3	3	2	8	6.95000
3	3	3	7	0.00000
3	3	4	8	4.16250
3	3	5	5	769.20000
3	4	1	7	714.40000
3	4	2	7	239.71429
3	4	3	7	127.85714
3	4	4	8	345.03750
3	4	5	7	632.41429
3	5	1	6	26.58333
3	5	2	8	15.65000
3	5	3	6	0.03333
3	5	4	8	131.36250
3	5	5	8	973.42500
3	6	1	9	152.96667
3	6	2	8	195.30000
3	6	3	8	318.65000
3	6	4	7	73.42857
3	6	5	7	133.60000
3	7	1	6	319.16667
3	7	2	9	615.10000
3	7	3	9	2129.34444
3	7	4	8	1181.21250
3	7	5	9	1006.27778

SEASON=FALL   SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: AIR_B

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	110	26736980.56843813	243063.45971307	2.89	0.0001	0.298055	338.2880
ERROR	749	62967893.47355023	84069.28367630		STD DEV		AIR_B MEAN
CORRECTED TOTAL	859	89704874.04198836			289.94703598		85.71011628

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
REP	2	1776065.34424456	10.56	0.0001	2	2044079.85994179	12.15	0.0001
ZONE	2	8056283.18244002	47.91	0.0001	2	7747978.26312125	46.38	0.0001
REP*ZONE	4	2230522.95662587	6.63	0.0001	4	2156220.75140829	6.41	0.0001
SPECIES	6	2252990.21292388	4.47	0.0002	6	2323821.06386830	4.61	0.0001
FERT	4	132939.78612575	0.40	0.8121	4	132698.93060930	0.39	0.8126
SPECIES*FERT	24	1228864.07162902	0.61	0.9296	24	1355402.51971050	0.67	0.8813
ZONE*SPECIES	12	7241885.00455980	7.18	0.0001	12	6732403.44652009	6.67	0.0001
ZONE*FERT	8	589946.75692782	0.88	0.5353	8	667547.99966411	0.99	0.4403
ZONE*SPECIES*FERT	48	3227483.25296144	0.80	0.8324	48	3227483.25296143	0.80	0.8324

C113

SEASON=FALL   SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE AIR_B

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=749   MS=84069.3

GROUPING	MEAN	N	REP
A	148.807246	276	1
B	72.676573	286	2
B			
B	39.779866	298	3

C114

SEASON=FALL SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE AIR_B

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=749   MS=84069.3

GROUPING	MEAN	N	ZONE
A	228.287407	270	3
B	23.921951	287	2
B			
B	17.136469	303	1

SEASON=FALL   SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

MEANS

REP	ZONE	N	AIR_B
1	1	100	50.520000
1	2	91	24.291209
1	3	85	397.744706
2	1	100	1.555000
2	2	94	31.535106
2	3	92	192.018478
3	1	103	0.000000
3	2	102	16.576471
3	3	93	109.286022

C116

SEASON=FALL   SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE AIR_H

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=749   MS=84059.3

GROUPING			MEAN	N	SPECIES
	A		167.282540	126	7
	A				
B	A		135.342373	118	4
B	A				
B	A	C	120.569912	113	5
B		C			
B	D	C	65.375410	122	6
B	D	C			
B	D	C	65.362992	127	2
	D	C			
	D	C	42.810156	128	1
	D				
	D		10.172222	126	3

SEASON=FALL   SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE AIR_B

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=749   MS=84069.3

GROUPING	MEAN	N	FERT
A	101.607471	174	4
A	93.638068	176	2
A	89.760479	167	5
A	87.247093	172	3
A	55.872515	171	1

6118

SEASON=FALL   SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

MEANS

SPECIES	FERT	N	AIR_B
1	1	27	43.074074
1	2	26	47.776923
1	3	25	69.432000
1	4	25	25.976000
1	5	25	27.572000
2	1	25	32.848000
2	2	26	117.846154
2	3	24	13.362500
2	4	25	93.888000
2	5	27	64.740741
3	1	26	9.615385
3	2	26	1.153846
3	3	25	0.000000
3	4	26	5.257692
3	5	23	37.608696
4	1	23	119.652174
4	2	23	87.695652
4	3	24	103.391667
4	4	24	253.708333
4	5	24	109.625000
5	1	23	113.976087
5	2	24	187.625000
5	3	23	60.500000
5	4	25	84.584000
5	5	18	166.388889
6	1	24	27.208333
6	2	25	84.880000
6	3	24	125.791667
6	4	25	33.832000
6	5	24	55.666667
7	1	23	56.291304
7	2	26	134.696154
7	3	27	224.374074
7	4	24	229.041667
7	5	26	181.757692

ZONE	SPECIES	N	AIR_B
1	1	45	0.000000
1	2	45	0.000000
1	3	45	0.000000
1	4	42	0.000000
1	5	36	144.652778
1	6	45	0.000000
1	7	45	0.000000
2	1	42	7.619048
2	2	40	3.395000
2	3	45	2.355556

SEASON=FALL   SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

MEANS

ZONE	SPECIES	N	AIR_B
2	4	41	0.000000
2	5	41	152.795122
2	6	38	0.000000
2	7	40	0.980000
3	1	41	125.846341
3	2	42	194.411905
3	3	36	32.658333
3	4	35	456.297143
3	5	36	59.786111
3	6	39	204.507692
3	7	41	513.131707

ZONE	FERT	N	AIR_B
1	1	61	22.196721
1	2	60	61.633333
1	3	62	2.508065
1	4	62	0.000000
1	5	58	0.000000
2	1	58	19.384483
2	2	58	19.831034
2	3	57	21.978947
2	4	56	21.398214
2	5	58	36.896552
3	1	52	136.075000
3	2	58	200.551448
3	3	53	256.569811
3	4	56	294.310714
3	5	51	251.960784

ZONE	SPECIES	FERT	N	AIR_B
1	1	1	9	0.000000
1	1	2	9	0.000000
1	1	3	9	0.000000
1	1	4	9	0.000000
1	1	5	9	0.000000
1	2	1	9	0.000000
1	2	2	9	0.000000
1	2	3	9	0.000000
1	2	4	9	0.000000
1	2	5	9	0.000000
1	3	1	9	0.000000
1	3	2	9	0.000000
1	3	3	9	0.000000
1	3	4	9	0.000000
1	3	5	9	0.000000

C120

SEASON=FALL   SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

MEANS

ZONE	SPECIES	FERT	N	AIR_P
1	4	1	8	0.000000
1	4	2	8	0.000000
1	4	3	8	0.000000
1	4	4	9	0.000000
1	4	5	9	0.000000
1	5	1	8	169.250000
1	5	2	7	528.285714
1	5	3	9	17.277778
1	5	4	8	0.000000
1	5	5	4	0.000000
1	6	1	9	0.000000
1	6	2	9	0.000000
1	6	3	9	0.000000
1	6	4	9	0.000000
1	6	5	9	0.000000
1	7	1	9	0.000000
1	7	2	9	0.000000
1	7	3	9	0.000000
1	7	4	9	0.000000
1	7	5	9	0.000000
2	1	1	9	0.000000
2	1	2	8	40.000000
2	1	3	8	0.000000
2	1	4	8	0.000000
2	1	5	9	0.000000
2	2	1	8	0.000000
2	2	2	9	12.555556
2	2	3	7	3.257143
2	2	4	7	0.000000
2	2	5	9	0.000000
2	3	1	9	0.000000
2	3	2	9	0.000000
2	3	3	9	0.000000
2	3	4	9	11.777778
2	3	5	9	0.000000
2	4	1	9	0.000000
2	4	2	8	0.000000
2	4	3	9	0.000000
2	4	4	7	0.000000
2	4	5	8	0.000000
2	5	1	9	124.922222
2	5	2	8	84.750000
2	5	3	8	153.750000
2	5	4	9	121.366667
2	5	5	7	305.714286
2	6	1	6	0.000000
2	6	2	8	0.000000
2	6	3	7	0.000000
2	6	4	9	0.000000

SEASON=FALL   SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

MEANS

ZONE	SPECIES	FERT	N	AIR_D
2	6	5	8	0.000000
2	7	1	8	0.000000
2	7	2	8	4.900000
2	7	3	9	0.000000
2	7	4	7	0.000000
2	7	5	8	0.000000
3	1	1	9	129.222222
3	1	2	9	102.466667
3	1	3	8	216.975000
3	1	4	8	81.175000
3	1	5	7	98.471429
3	2	1	8	102.650000
3	2	2	8	368.875000
3	2	3	8	37.237500
3	2	4	9	260.800000
3	2	5	9	194.222222
3	3	1	8	31.250000
3	3	2	8	3.750000
3	3	3	7	0.000000
3	3	4	8	3.837500
3	3	5	5	173.000000
3	4	1	6	458.666667
3	4	2	7	288.142857
3	4	3	7	354.485714
3	4	4	8	761.125000
3	4	5	7	375.857143
3	5	1	6	23.666667
3	5	2	9	14.111111
3	5	3	6	1.000000
3	5	4	8	127.787500
3	5	5	7	122.142857
3	6	1	9	72.555556
3	6	2	8	265.250000
3	6	3	8	377.375000
3	6	4	7	120.828571
3	6	5	7	190.857143
3	7	1	6	215.783333
3	7	2	9	384.766667
3	7	3	9	673.122222
3	7	4	8	687.125000
3	7	5	9	525.077778

C122

SEASON=SPRI   SEASON=SPRI

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
REP	3	1 2 3
ZONE	3	1 2 3
SPECIES	7	1 2 3 4 5 6 7
FERT	5	1 2 3 4 5

NUMBER OF OBSERVATIONS IN BY GROUP = 2206

GROUP	OBS	DEPENDENT VARIABLES
1	504	RT_BIO
2	499	AIR_B

NOTE: VARIABLES IN EACH GROUP ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES.

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   21:10 MONDAY, APRIL 17, 1978   23

SEASON=SPRI   SEASON=SPRI

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: RT_BIO

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	110	10332329.50927922	93930.26826617	3.76	0.0001	0.512553	364.1793
ERROR	393	9826246.17403427	25003.17092630		STD DEV		RT_BIO MEAN
CORRECTED TOTAL	503	20158575.68331349			158.12391004		43.41924603

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
REP	2	103601.46106669	2.07	0.1273	2	20983.50961156	0.42	0.6576
ZONE	2	1773291.24517403	35.46	0.0001	2	1501547.00189500	30.03	0.0001
REP*ZONE	4	205381.73528921	2.05	0.0862	4	19699.01207643	0.20	0.9399
SPECIES	6	1314873.17199626	8.76	0.0001	6	2040738.33524857	13.60	0.0001
FERT	4	73535.60886208	0.74	0.5683	4	58061.77315046	0.58	0.6769
SPECIES*FERT	24	722156.34979079	1.20	0.2339	24	981148.29787848	1.64	0.0313
ZONE*SPECIES	12	4125039.04614203	13.75	0.0001	12	3937793.10758833	13.12	0.0001
ZONE*FERT	8	218227.29050964	1.09	0.3684	8	147538.81597624	0.74	0.6583
ZONE*SPECIES*FERT	48	1796223.60044849	1.50	0.0218	48	1796223.60044849	1.50	0.0218

C124

SEASON=SPRI   SEASON=SPRI

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE RT_BIO

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=393   MS=25003.2

GROUPING	MEAN	N	REP
A	62.218343	169	1
A			
A	40.322024	168	2
A			
A	27.510778	167	3

C125

SEASON=SPRI   SEASON=SPRI

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE WT_HTO

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=393   MS=25003.2

GROUPING	MEAN	N	ZONE
A	133.818000	150	3
B	8.740541	148	2
B			
B	2.509709	206	1

SEASON=SPRI   SEASON=SPRI

GENERAL LINEAR MODELS PROCEDURE

MEANS

REP	ZONE	N	RT_BIO
1	1	69	7.452754
1	2	52	9.736538
1	3	48	197.741667
2	1	68	0.000000
2	2	51	13.460784
2	3	49	124.236735
3	1	69	0.000000
3	2	45	2.240000
3	3	53	84.783019

SEASON=SPRI   SEASON=SPRI

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE RT_BIO

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=393   MS=25003.2

GROUPING	MEAN	N	SPECIES
A	162.472973	74	7
B	54.123377	77	2
B			
B	25.116667	66	5
B			
B	22.530000	80	1
B			
B	21.064516	62	6
B			
B	13.430435	69	4
B			
B	0.000000	76	3

C128

SEASON=SPRI   SEASON=SPRI

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE RT_BIO

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=393   MS=25003.2

GROUPING	MEAN	N	FERT
A	63.733333	99	4
A			
A	41.454455	101	2
A			
A	38.684158	101	5
A			
A	38.254082	98	1
A			
A	35.531429	105	3

C129

SEASON=SPRI   SEASON=SPRI

GENERAL LINEAR MODELS PROCEDURE

MEANS

SPECIES	FERT	N	RT_BIO
1	1	16	35.075000
1	2	18	13.972222
1	3	16	34.662500
1	4	14	3.857143
1	5	16	23.818750
2	1	15	48.873333
2	2	16	77.631250
2	3	14	12.892857
2	4	16	48.893750
2	5	16	76.843750
3	1	14	0.000000
3	2	15	0.000000
3	3	17	0.000000
3	4	16	0.000000
3	5	14	0.000000
4	1	12	7.000000
4	2	11	3.090909
4	3	15	20.866667
4	4	15	5.640000
4	5	16	25.693750
5	1	13	37.507692
5	2	13	23.561538
5	3	14	22.978571
5	4	13	10.669231
5	5	13	31.030769
6	1	13	34.076923
6	2	12	4.416667
6	3	14	50.571429
6	4	10	0.000000
6	5	13	7.846154
7	1	15	96.000000
7	2	16	143.750000
7	3	15	110.200000
7	4	15	350.000000
7	5	13	106.153846

ZONE	SPECIES	N	RT_BIO
1	1	30	0.000000
1	2	30	0.000000
1	3	30	0.000000
1	4	29	0.000000
1	5	27	19.148148
1	6	30	0.000000
1	7	30	0.000000
2	1	25	0.884000
2	2	18	0.000000
2	3	23	0.000000

C130

STATISTICAL ANALYSIS SYSTEM 21:10 MONDAY, APRIL 17, 1978 30
SEASON=SPRI SEASON=SPRI

GENERAL LINEAR MODELS PROCEDURE

MEANS

ZONE	SPECIES	N	RT_H10
2	4	23	0.000000
2	5	18	47.138889
2	6	16	26.437500
2	7	25	0.000000
3	1	25	71.212000
3	2	29	143.706897
3	3	23	0.000000
3	4	17	54.511765
3	5	21	13.914286
3	6	16	55.187500
3	7	19	632.789474

ZONE	FERT	N	RT_H10
1	1	41	9.000000
1	2	42	3.523810
1	3	42	0.000000
1	4	42	0.000000
1	5	39	0.000000
2	1	31	17.387097
2	2	27	5.122222
2	3	30	10.723333
2	4	30	2.946667
2	5	30	6.873333
3	1	26	109.265385
3	2	32	121.843750
3	3	33	103.306061
3	4	27	230.414815
3	5	32	115.653125

ZONE	SPECIES	FERT	N	RT_H10
1	1	1	6	0.00000
1	1	2	6	0.00000
1	1	3	6	0.00000
1	1	4	6	0.00000
1	1	5	6	0.00000
1	2	1	6	0.00000
1	2	2	6	0.00000
1	2	3	6	0.00000
1	2	4	6	0.00000
1	2	5	6	0.00000
1	3	1	6	0.00000
1	3	2	6	0.00000
1	3	3	6	0.00000
1	3	4	6	0.00000
1	3	5	6	0.00000

SEASON=SPRI   SEASON=SPRI

GENERAL LINEAR MODELS PROCEDURE

MEANS

ZONE	SPECIES	FERT	N	RT_BIO
1	4	1	5	0.00000
1	4	2	6	0.00000
1	4	3	6	0.00000
1	4	4	6	0.00000
1	4	5	6	0.00000
1	5	1	6	61.50000
1	5	2	6	24.66667
1	5	3	6	0.00000
1	5	4	6	0.00000
1	5	5	3	0.00000
1	6	1	6	0.00000
1	6	2	6	0.00000
1	6	3	6	0.00000
1	6	4	6	0.00000
1	6	5	6	0.00000
1	7	1	6	0.00000
1	7	2	6	0.00000
1	7	3	6	0.00000
1	7	4	6	0.00000
1	7	5	6	0.00000
2	1	1	5	0.00000
2	1	2	6	0.00000
2	1	3	5	0.00000
2	1	4	5	0.00000
2	1	5	4	5.52500
2	2	1	4	0.00000
2	2	2	4	0.00000
2	2	3	2	0.00000
2	2	4	4	0.00000
2	2	5	4	0.00000
2	3	1	4	0.00000
2	3	2	3	0.00000
2	3	3	5	0.00000
2	3	4	5	0.00000
2	3	5	6	0.00000
2	4	1	5	0.00000
2	4	2	4	0.00000
2	4	3	4	0.00000
2	4	4	5	0.00000
2	4	5	5	0.00000
2	5	1	4	29.00000
2	5	2	2	69.15000
2	5	3	5	64.34000
2	5	4	3	29.46667
2	5	5	4	46.02500
2	6	1	4	105.75000
2	6	2	2	0.00000
2	6	3	4	0.00000
2	6	4	3	0.00000

SEASON=SPRI   SEASON=SPRI

GENERAL LINEAR MODELS PROCEDURE

MEANS

ZONE	SPECIES	FERT	N	RT_BIO
2	6	5	3	0.00000
2	7	1	5	0.00000
2	7	2	6	0.00000
2	7	3	5	0.00000
2	7	4	5	0.00000
2	7	5	4	0.00000
3	1	1	5	112.24000
3	1	2	6	41.91667
3	1	3	5	110.92000
3	1	4	3	18.00000
3	1	5	6	59.83333
3	2	1	5	146.62000
3	2	2	6	207.01667
3	2	3	6	30.08333
3	2	4	6	130.38333
3	2	5	6	204.91667
3	3	1	4	0.00000
3	3	2	6	0.00000
3	3	3	6	0.00000
3	3	4	5	0.00000
3	3	5	2	0.00000
3	4	1	2	42.00000
3	4	2	1	34.00000
3	4	3	5	62.60000
3	4	4	4	21.15000
3	4	5	5	82.22000
3	5	1	3	0.86667
3	5	2	5	4.00000
3	5	3	3	0.00000
3	5	4	4	12.57500
3	5	5	6	36.55000
3	6	1	3	6.66667
3	6	2	4	13.25000
3	6	3	4	177.00000
3	6	4	1	0.00000
3	6	5	4	25.50000
3	7	1	4	360.00000
3	7	2	4	575.00000
3	7	3	4	413.25000
3	7	4	4	1312.50000
3	7	5	3	460.00000

C133

SEASON=SPRI SEASON=SPRI

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: AIR_H

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	110	2784519.34310723	25313.81221007	2.33	0.0001	0.397702	327.7383
ERROR	388	4216995.37072042	10868.54476990		STD DEV		AIR_H MEAN
CORRECTED TOTAL	498	7001514.71382765			104.25231302		31.80961924

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
REP	2	61470.56051425	2.83	0.0604	2	17377.66634945	0.80	0.4503
ZONE	2	681281.57747185	31.34	0.0001	2	545492.07844119	25.09	0.0001
REP*ZONE	4	65206.92366962	1.50	0.2015	4	11587.57650034	0.27	0.8994
SPECIES	6	316222.86018757	4.85	0.0001	6	493481.36287587	7.57	0.0001
FERT	4	11953.94281007	0.27	0.8941	4	10053.24202028	0.23	0.9208
SPECIES*FERT	24	126364.81215830	0.48	0.9823	24	145655.58534158	0.56	0.9563
ZONE*SPECIES	12	1088573.90098749	8.35	0.0001	12	1108704.41198238	8.50	0.0001
ZONE*FERT	8	48272.77737077	0.56	0.8144	8	47573.85782909	0.55	0.8207
ZONE*SPECIES*FERT	48	385171.98793733	0.74	0.9013	48	385171.98793733	0.74	0.9013

C134

SEASON=SPRI   SEASON=SPRI

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE AIR_B

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=388   MS=1086.5

GROUPING		MEAN	N	REP
	A	47.294048	168	1
	A			
B	A	25.455152	165	2
B				
B		22.454819	166	3

C135

SEASON=SPRI   SEASON=SPRI

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE AIR_B

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=388   MS=10868.5

GROUPING	MEAN	N	ZONE
A	88.962069	145	3
B	12.949324	148	2
B			
B	5.131068	206	1

C136

SEASON=SPRI SEASON=SPRI

GENERAL LINEAR MODELS PROCEDURE

MEANS

REP	ZONE	N	AIR_5
1	1	69	15.318841
1	2	52	14.413462
1	3	47	130.614894
2	1	68	0.000000
2	2	51	16.586275
2	3	46	72.917391
3	1	69	0.000000
3	2	45	7.135556
3	3	52	65.507692

SEASON=SPRI   SEASON=SPRI

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE AIR_H

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=388   MS=1086M.5

GROUPING		MEAN	N	SPECIES
	A	81.891892	74	7
	A			
B	A	47.610606	66	5
B				
B		45.132432	74	2
B				
B	C	22.748750	80	1
B	C			
B	C	15.358710	62	6
B	C			
B	C	8.358209	67	4
	C			
	C	0.000000	76	3

C138

SEASON=SPRI   SEASON=SPRI

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE AIR_P

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=398   MS=1086R.5

GROUPING	MEAN	N	FERT
A	36.744444	99	5
A			
A	36.051020	98	1
A			
A	31.018367	98	4
A			
A	28.490000	100	2
A			
A	27.052885	104	3

C139

SEASON=SPRI   SEASON=SPRI

GENERAL LINEAR MODELS PROCEDURE

MEANS

SPECIES	FERT	N	AIR_B
1	1	16	17.000000
1	2	18	35.616667
1	3	16	21.656250
1	4	14	10.000000
1	5	16	26.268750
2	1	15	53.273333
2	2	15	56.726667
2	3	13	36.692308
2	4	16	37.450000
2	5	15	40.906667
3	1	14	0.000000
3	2	15	0.000000
3	3	17	0.000000
3	4	16	0.000000
3	5	14	0.000000
4	1	12	8.333333
4	2	11	1.818182
4	3	15	5.600000
4	4	14	0.000000
4	5	15	23.733333
5	1	13	77.992308
5	2	13	29.461538
5	3	14	48.071429
5	4	13	17.738462
5	5	13	64.753846
6	1	13	34.461538
6	2	12	6.166667
6	3	14	20.928571
6	4	10	0.000000
6	5	13	10.461538
7	1	15	60.000000
7	2	16	55.000000
7	3	15	67.666667
7	4	15	138.000000
7	5	13	97.692308

ZONE	SPECIES	N	AIR_B
1	1	30	0.000000
1	2	30	0.000000
1	3	30	0.000000
1	4	29	0.000000
1	5	27	39.148148
1	6	30	0.000000
1	7	30	0.000000
2	1	25	4.484000
2	2	18	0.000000
2	3	23	0.000000

C140

SEASON=SPRI   SEASON=SPRI

GENERAL LINEAR MODELS PROCEDURE

MEANS

ZONE	SPECIES	N	AIR_B
2	4	23	0.000000
2	5	18	77.633333
2	6	16	25.437500
2	7	25	0.000000
3	1	25	68.312000
3	2	26	128.453846
3	3	23	0.000000
3	4	15	37.333333
3	5	21	32.757143
3	6	16	34.000000
3	7	19	318.947368

ZONE	FERT	N	AIR_B
1	1	41	22.341463
1	2	42	3.357143
1	3	42	0.000000
1	4	42	0.000000
1	5	39	0.000000
2	1	31	16.158065
2	2	27	8.222222
2	3	30	22.433333
2	4	30	4.033333
2	5	30	13.320000
3	1	26	81.538462
3	2	31	80.193548
3	3	32	66.890625
3	4	26	112.261538
3	5	30	107.936667

ZONE	SPECIES	FERT	N	AIR_B
1	1	1	6	0.000000
1	1	2	6	0.000000
1	1	3	6	0.000000
1	1	4	6	0.000000
1	1	5	6	0.000000
1	2	1	6	0.000000
1	2	2	6	0.000000
1	2	3	6	0.000000
1	2	4	6	0.000000
1	2	5	6	0.000000
1	3	1	6	0.000000
1	3	2	6	0.000000
1	3	3	6	0.000000
1	3	4	6	0.000000
1	3	5	6	0.000000

C141

SEASON=SPRI SEASON=SPRI

GENERAL LINEAR MODELS PROCEDURE

MEANS

ZONE	SPECIES	FERT	N	AIR_B
1	4	1	5	0.000000
1	4	2	6	0.000000
1	4	3	6	0.000000
1	4	4	6	0.000000
1	4	5	6	0.000000
1	5	1	6	152.666667
1	5	2	6	23.500000
1	5	3	6	0.000000
1	5	4	6	0.000000
1	5	5	3	0.000000
1	6	1	6	0.000000
1	6	2	6	0.000000
1	6	3	6	0.000000
1	6	4	6	0.000000
1	6	5	6	0.000000
1	7	1	6	0.000000
1	7	2	6	0.000000
1	7	3	6	0.000000
1	7	4	6	0.000000
1	7	5	6	0.000000
2	1	1	5	0.000000
2	1	2	6	0.000000
2	1	3	5	0.000000
2	1	4	5	0.000000
2	1	5	4	28.025000
2	2	1	4	0.000000
2	2	2	4	0.000000
2	2	3	2	0.000000
2	2	4	4	0.000000
2	2	5	4	0.000000
2	3	1	4	0.000000
2	3	2	3	0.000000
2	3	3	5	0.000000
2	3	4	5	0.000000
2	3	5	6	0.000000
2	4	1	5	0.000000
2	4	2	4	0.000000
2	4	3	4	0.000000
2	4	4	5	0.000000
2	4	5	5	0.000000
2	5	1	4	23.475000
2	5	2	2	111.000000
2	5	3	5	134.600000
2	5	4	3	40.333333
2	5	5	4	71.875000
2	6	1	4	101.750000
2	6	2	2	0.000000
2	6	3	4	0.000000
2	6	4	3	0.000000

C142

SEASON=SPRI SEASON=SPRI

GENERAL LINEAR MODELS PROCEDURE

MEANS

ZONE	SPECIES	FERT	N	AIR_B
2	6	5	3	0.000000
2	7	1	5	0.000000
2	7	2	6	0.000000
2	7	3	5	0.000000
2	7	4	5	0.000000
2	7	5	4	0.000000
3	1	1	5	54.400000
3	1	2	6	106.850000
3	1	3	5	69.300000
3	1	4	3	46.666667
3	1	5	6	51.366667
3	2	1	5	159.820000
3	2	2	5	170.180000
3	2	3	5	95.400000
3	2	4	6	99.866667
3	2	5	5	122.720000
3	3	1	4	0.000000
3	3	2	6	0.000000
3	3	3	6	0.000000
3	3	4	5	0.000000
3	3	5	2	0.000000
3	4	1	2	50.000000
3	4	2	1	20.000000
3	4	3	5	16.800000
3	4	4	3	0.000000
3	4	5	4	89.000000
3	5	1	3	1.333333
3	5	2	5	4.000000
3	5	3	3	0.000000
3	5	4	4	27.400000
3	5	5	6	92.383333
3	6	1	3	13.666667
3	6	2	4	18.500000
3	6	3	4	73.250000
3	6	4	1	0.000000
3	6	5	4	34.000000
3	7	1	4	225.000000
3	7	2	4	220.000000
3	7	3	4	235.000000
3	7	4	4	517.500000
3	7	5	3	423.333333

C143

PART 3

SEASON=FALL   SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
REP	3	1 2 3
ZONE	3	1 2 3
SPECIES	7	1 2 3 4 5 6 7
FERT	5	1 2 3 4 5

NUMBER OF OBSERVATIONS IN BY GROUP = 2836

GROUP	OBS	DEPENDENT VARIABLES
1	918	RT_BIO
2	916	AIR_B

NOTE: VARIABLES IN EACH GROUP ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES.

SEASON=FALL   SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: RT_BIO

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	110	14538612.37440363	132169.20340367	1.34	0.0160	0.154384	735.4930
					STD DEV		RT_BIO MEAN
ERROR	807	79633296.52934364	98678.18652955		314.13084501		42.71023965
CORRECTED TOTAL	917	94171908.90374727					

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
REP	2	256963.77400670	1.30	0.2726	2	209998.55441857	1.06	0.3455
ZONE	2	2876524.63644587	14.58	0.0001	2	2915604.34373116	14.77	0.0001
REP*ZONE	4	376491.00714269	0.95	0.4322	4	346620.06308687	0.88	0.4765
SPECIES	6	1243045.85325114	2.10	0.0511	6	1446195.19973291	2.44	0.0240
FERT	4	430658.28390713	1.09	0.3597	4	509461.32326600	1.29	0.2720
SPECIES*FERT	24	1646123.75490401	0.70	0.8597	24	1925666.84933939	0.81	0.7224
ZONE*SPECIES	12	3038565.75990342	2.57	0.0024	12	3178119.37468744	2.68	0.0015
ZONE*FERT	8	941960.21652323	1.19	0.3000	8	986162.77372384	1.25	0.2672
ZONE*SPECIES*FERT	48	3728279.08831902	0.79	0.8499	48	3728279.08831900	0.79	0.8499

C146

SEASON=FALL   SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE RT_RIO

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=807   MS=98678.2

GROUPING	MEAN	N	REP
A	65.768690	313	2
A			
A	33.478289	304	3
A			
A	28.056478	301	1

SEASON=FALL   SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE WT_010

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=807   MS=98678.2

GROUPING	MEAN	N	ZONE
A	123.939057	297	3
B	7.611401	307	2
B			
B	0.000000	314	1

C148

SEASON=FALL SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

MEANS

REP	ZONE	N	R1_HIO
1	1	104	0.000000
1	2	101	6.614851
1	3	96	81.009375
2	1	105	0.000000
2	2	103	12.621359
2	3	105	183.672381
3	1	105	0.000000
3	2	103	4.174757
3	3	96	101.535417

```
                SEASON=FALL   SEASON=FALL

              GENERAL LINEAR MODELS PROCEDURE

       DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE PT_BIO

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

      ALPHA LEVEL=.05        DF=807       MS=98678.2

       GROUPING                   MEAN      N    SPECIES

                A           122.551515    132    7
                A
       B        A            56.330827    133    3
       B        A
       B        A            42.982443    131    2
       B
       B                     29.226866    134    6
       B
       B                     27.350806    124    5
       B
       B                     20.159690    129    1
       B
       B                      0.000000    135    4
```

C150

SEASON=FALL SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE RT_BIO

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=807   MS=9867P.2

GROUPING	MEAN	N	FERT
A	71.545055	182	4
A	64.994565	184	1
A	36.635135	185	3
A	22.151630	184	2
A	18.439344	183	5

C151

SEASON=FALL   SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

MEANS

SPECIES	FERT	N	RT_BIO
1	1	25	8.560000
1	2	26	42.869231
1	3	25	21.160000
1	4	26	29.192308
1	5	27	0.370370
2	1	27	46.148148
2	2	25	40.192000
2	3	26	45.153846
2	4	27	35.185185
2	5	26	48.303846
3	1	26	55.269231
3	2	27	0.000000
3	3	26	21.692308
3	4	27	151.259259
3	5	27	52.111111
4	1	27	0.000000
4	2	27	0.000000
4	3	27	0.000000
4	4	27	0.000000
4	5	27	0.000000
5	1	25	23.400000
5	2	25	43.748000
5	3	27	23.185185
5	4	23	28.678261
5	5	24	17.800000
6	1	27	85.481481
6	2	27	25.318519
6	3	27	22.500000
6	4	27	1.592593
6	5	26	10.550000
7	1	27	228.481481
7	2	27	6.637037
7	3	27	121.370370
7	4	25	262.064000
7	5	26	0.000000

ZONE	SPECIES	N	RT_BIO
1	1	45	0.000000
1	2	44	0.000000
1	3	45	0.000000
1	4	45	0.000000
1	5	45	0.000000
1	6	45	0.000000
1	7	45	0.000000
2	1	44	0.000000
2	2	45	1.444444
2	3	44	0.000000

C152

SEASON=FALL   SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

MEANS

ZONE	SPECIES	N	RT_BIO
2	4	45	0.000000
2	5	39	43.515385
2	6	45	14.133333
2	7	45	0.000000
3	1	40	65.015000
3	2	42	132.516667
3	3	44	170.272727
3	4	45	0.000000
3	5	40	42.360000
3	6	44	74.554545
3	7	42	385.161905

ZONE	FERT	N	RT_BIO
1	1	63	0.000000
1	2	63	0.000000
1	3	63	0.000000
1	4	63	0.000000
1	5	62	0.000000
2	1	59	17.694915
2	2	62	4.969355
2	3	63	9.936508
2	4	61	1.393443
2	5	62	5.403226
3	1	62	176.048387
3	2	59	63.861017
3	3	59	104.262712
3	4	58	223.037931
3	5	59	51.515254

ZONE	SPECIES	FERT	N	RT_BIO
1	1	1	9	0.000000
1	1	2	9	0.000000
1	1	3	9	0.000000
1	1	4	9	0.000000
1	1	5	9	0.000000
1	2	1	9	0.000000
1	2	2	9	0.000000
1	2	3	9	0.000000
1	2	4	9	0.000000
1	2	5	8	0.000000
1	3	1	9	0.000000
1	3	2	9	0.000000
1	3	3	9	0.000000
1	3	4	9	0.000000
1	3	5	9	0.000000

SEASON=FALL   SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

MEANS

ZONE	SPECIES	FERT	N	RT_BIO
1	4	1	9	0.000000
1	4	2	9	0.000000
1	4	3	9	0.000000
1	4	4	9	0.000000
1	4	5	9	0.000000
1	5	1	9	0.000000
1	5	2	9	0.000000
1	5	3	9	0.000000
1	5	4	9	0.000000
1	5	5	9	0.000000
1	6	1	9	0.000000
1	6	2	9	0.000000
1	6	3	9	0.000000
1	6	4	9	0.000000
1	6	5	9	0.000000
1	7	1	9	0.000000
1	7	2	9	0.000000
1	7	3	9	0.000000
1	7	4	9	0.000000
1	7	5	9	0.000000
2	1	1	8	0.000000
2	1	2	9	0.000000
2	1	3	9	0.000000
2	1	4	9	0.000000
2	1	5	9	0.000000
2	2	1	9	0.000000
2	2	2	9	0.000000
2	2	3	9	0.000000
2	2	4	9	7.222222
2	2	5	9	0.000000
2	3	1	8	0.000000
2	3	2	9	0.000000
2	3	3	9	0.000000
2	3	4	9	0.000000
2	3	5	9	0.000000
2	4	1	9	0.000000
2	4	2	9	0.000000
2	4	3	9	0.000000
2	4	4	9	0.000000
2	4	5	9	0.000000
2	5	1	7	80.285714
2	5	2	8	38.512500
2	5	3	9	69.555556
2	5	4	7	2.857143
2	5	5	8	22.625000
2	6	1	9	53.555556
2	6	2	9	0.000000
2	6	3	9	0.000000
2	6	4	9	0.000000

4
C154

SEASON=FALL   SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

MEANS

ZONE	SPECIES	FERT	N	RT_BIO
2	6	5	9	17.111111
2	7	1	9	0.000000
2	7	2	9	0.000000
2	7	3	9	0.000000
2	7	4	9	0.000000
2	7	5	9	0.000000
3	1	1	8	26.750000
3	1	2	8	139.325000
3	1	3	7	75.571429
3	1	4	8	91.625000
3	1	5	9	1.111111
3	2	1	9	1[illegible].444444
3	2	2	7	143.542857
3	2	3	8	146.750000
3	2	4	9	98.333333
3	2	5	9	159.544444
3	3	1	9	159.666667
3	3	2	9	0.000000
3	3	3	8	70.500000
3	3	4	9	455.777778
3	3	5	9	156.333333
3	4	1	9	0.000000
3	4	2	9	0.000000
3	4	3	9	0.000000
3	4	4	9	0.000000
3	4	5	9	0.000000
3	5	1	9	2.555556
3	5	2	8	98.200000
3	5	3	9	0.000000
3	5	4	7	91.571429
3	5	5	7	55.171429
3	6	1	9	202.888889
3	6	2	9	75.955556
3	6	3	9	67.500000
3	6	4	9	4.777778
3	6	5	8	15.037500
3	7	1	9	685.444444
3	7	2	9	19.911111
3	7	3	9	364.111111
3	7	4	7	935.942857
3	7	5	8	0.000000

STATISTICAL ANALYSIS SYSTEM 13:52 MONDAY, APRIL 17, 1978 12

SEASON=FALL SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: AIR_U

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	110	17040209.42561469	154910.99477832	1.39	0.0074	0.159896	761.9043
ERROR	805	89530062.08193988	111217.46842477		STD DEV		AIR_U MEAN
CORRECTED TOTAL	915	106570271.50755457			333.49283114		43.77056170

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
REP	2	69316.91377569	0.31	0.7323	2	52152.51655141	0.23	0.7911
ZONE	2	3114217.50261061	14.00	0.0001	2	3089782.60873322	13.89	0.0001
REP*ZONE	4	94156.42900844	0.21	0.9320	4	88523.35497179	0.20	0.9389
SPECIES	6	1658509.53882603	2.49	0.0218	6	1661587.77556743	2.49	0.0215
FERT	4	182301.78285750	0.41	0.8017	4	166250.52385765	0.37	0.8275
SPECIES*FERT	24	2539994.24936843	0.95	0.5301	24	2647854.34381412	0.99	0.4741
ZONE*SPECIES	12	3830087.59558084	2.87	0.0007	12	3629974.98681886	2.72	0.0013
ZONE*FERT	8	323451.88029069	0.36	0.9396	8	285508.87827024	0.32	0.9583
ZONE*SPECIES*FERT	48	5228173.53329646	0.98	0.5146	48	5228173.53329645	0.98	0.5146

C156

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   13:52 MONDAY, APRIL 17, 1978   13

SEASON=FALL   SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE AIR_6

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=805   MS=111217

GROUPING	MEAN	N	REP
A	54.389457	313	2
A			
A	43.320724	304	3
A			
A	33.113043	299	1

C157

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   13:52 MONDAY, APRIL 17, 1978   14

SEASON=FALL   SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE AIR_B

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=805   MS=111217

GROUPING	MEAN	N	ZONE
A	128.481356	295	3
B	7.140717	307	2
B			
B	0.000000	314	1

SEASON=FALL   SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

MEANS

REP	ZONE	N	FIR_9
1	1	104	0.000000
1	2	101	6.843564
1	3	94	97.974468
2	1	105	0.000000
2	2	103	11.087379
2	3	105	151.256190
3	1	105	0.000000
3	2	103	3.485437
3	3	96	133.442708

C159

SEASON=FALL SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE AIR_D

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=605 MS=111217

GROUPING		MEAN	N	SPECIES
	A	137.280303	132	7
	A			
B	A	63.841667	132	3
B				
B		35.929771	131	2
B				
B		24.028125	128	1
B				
B		22.668548	124	5
B				
B		22.035821	134	6
B				
B		0.000000	135	4

SEASON=FALL   SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE AIR_H

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=805   MS=111217

GROUPING	MEAN	N	FERT
A	62.505435	184	1
A			
A	56.166486	185	3
A			
A	47.776243	181	4
A			
A	35.192308	182	5
A			
A	22.037500	184	2

C161

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   13:52 MONDAY, APRIL 17, 1978   16

SEASON=FALL   SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

MEANS

SPECIES	FERT	N	AIR_B
1	1	25	16.760000
1	2	26	23.011538
1	3	25	27.240000
1	4	25	52.292000
1	5	27	2.592593
2	1	27	55.518519
2	2	25	57.776000
2	3	26	18.076923
2	4	27	13.092593
2	5	26	36.150000
3	1	26	12.307692
3	2	27	0.000000
3	3	26	16.307692
3	4	27	99.111111
3	5	26	192.580769
4	1	27	0.000000
4	2	27	0.000000
4	3	27	0.000000
4	4	27	0.000000
4	5	27	0.000000
5	1	25	16.920000
5	2	25	24.524000
5	3	27	19.988889
5	4	23	47.439130
5	5	24	6.000000
6	1	27	70.222222
6	2	27	14.044444
6	3	27	15.151852
6	4	27	0.907407
6	5	26	9.384615
7	1	27	257.185185
7	2	27	37.774074
7	3	27	291.370370
7	4	25	91.604000
7	5	26	0.000000

ZONE	SPECIES	N	AIR_B
1	1	45	0.000000
1	2	44	0.000000
1	3	45	0.000000
1	4	45	0.000000
1	5	45	0.000000
1	6	45	0.000000
1	7	45	0.000000
2	1	44	0.000000
2	2	45	1.066667
2	3	44	0.000000

C162

SEASON=FALL SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

MEANS

ZONE	SPECIES	N	AIR_B
2	4	45	0.000000
2	5	39	38.723077
2	6	45	14.088889
2	7	45	0.000000
3	1	39	78.861538
3	2	42	110.923810
3	3	43	195.979070
3	4	45	0.000000
3	5	40	32.517500
3	6	44	52.700000
3	7	42	431.452381

ZONE	FERT	N	AIR_B
1	1	63	0.000000
1	2	63	0.000000
1	3	63	0.000000
1	4	63	0.000000
1	5	62	0.000000
2	1	59	15.694915
2	2	62	7.314516
2	3	63	8.566667
2	4	61	0.813279
2	5	62	3.612903
3	1	62	170.564516
3	2	59	61.040678
3	3	59	166.967797
3	4	57	134.973684
3	5	58	106.578966

ZONE	SPECIES	FERT	N	AIR_B
1	1	1	9	0.000000
1	1	2	9	0.000000
1	1	3	9	0.000000
1	1	4	9	0.000000
1	1	5	9	0.000000
1	2	1	9	0.000000
1	2	2	9	0.000000
1	2	3	9	0.000000
1	2	4	9	0.000000
1	2	5	8	0.000000
1	3	1	9	0.000000
1	3	2	9	0.000000
1	3	3	9	0.000000
1	3	4	9	0.000000
1	3	5	9	0.000000

C163

SEASON=FALL   SEASON=FALL

GENERAL LINEAR MODELS PROCEDURE

MEANS

ZONE	SPECIES	FERT	N	AIR_B
1	4	1	9	0.000000
1	4	2	9	0.000000
1	4	3	9	0.000000
1	4	4	9	0.000000
1	4	5	9	0.000000
1	5	1	9	0.000000
1	5	2	9	0.000000
1	5	3	9	0.000000
1	5	4	9	0.000000
1	5	5	9	0.000000
1	6	1	9	0.000000
1	6	2	9	0.000000
1	6	3	9	0.000000
1	6	4	9	0.000000
1	6	5	9	0.000000
1	7	1	9	0.000000
1	7	2	9	0.000000
1	7	3	9	0.000000
1	7	4	9	0.000000
1	7	5	9	0.000000
2	1	1	8	0.000000
2	1	2	9	0.000000
2	1	3	9	0.000000
2	1	4	9	0.000000
2	1	5	9	0.000000
2	2	1	9	0.000000
2	2	2	9	0.000000
2	2	3	9	0.000000
2	2	4	9	5.333333
2	2	5	9	0.000000
2	3	1	8	0.000000
2	3	2	9	0.000000
2	3	3	9	0.000000
2	3	4	9	0.000000
2	3	5	9	0.000000
2	4	1	9	0.000000
2	4	2	9	0.000000
2	4	3	9	0.000000
2	4	4	9	0.000000
2	4	5	9	0.000000
2	5	1	7	57.285714
2	5	2	8	56.687500
2	5	3	9	59.966667
2	5	4	7	0.142857
2	5	5	8	14.375000
2	6	1	9	58.333333
2	6	2	9	0.000000
2	6	3	9	0.000000
2	6	4	9	0.000000

C164

SEASON=FALL   SEASON=FALL

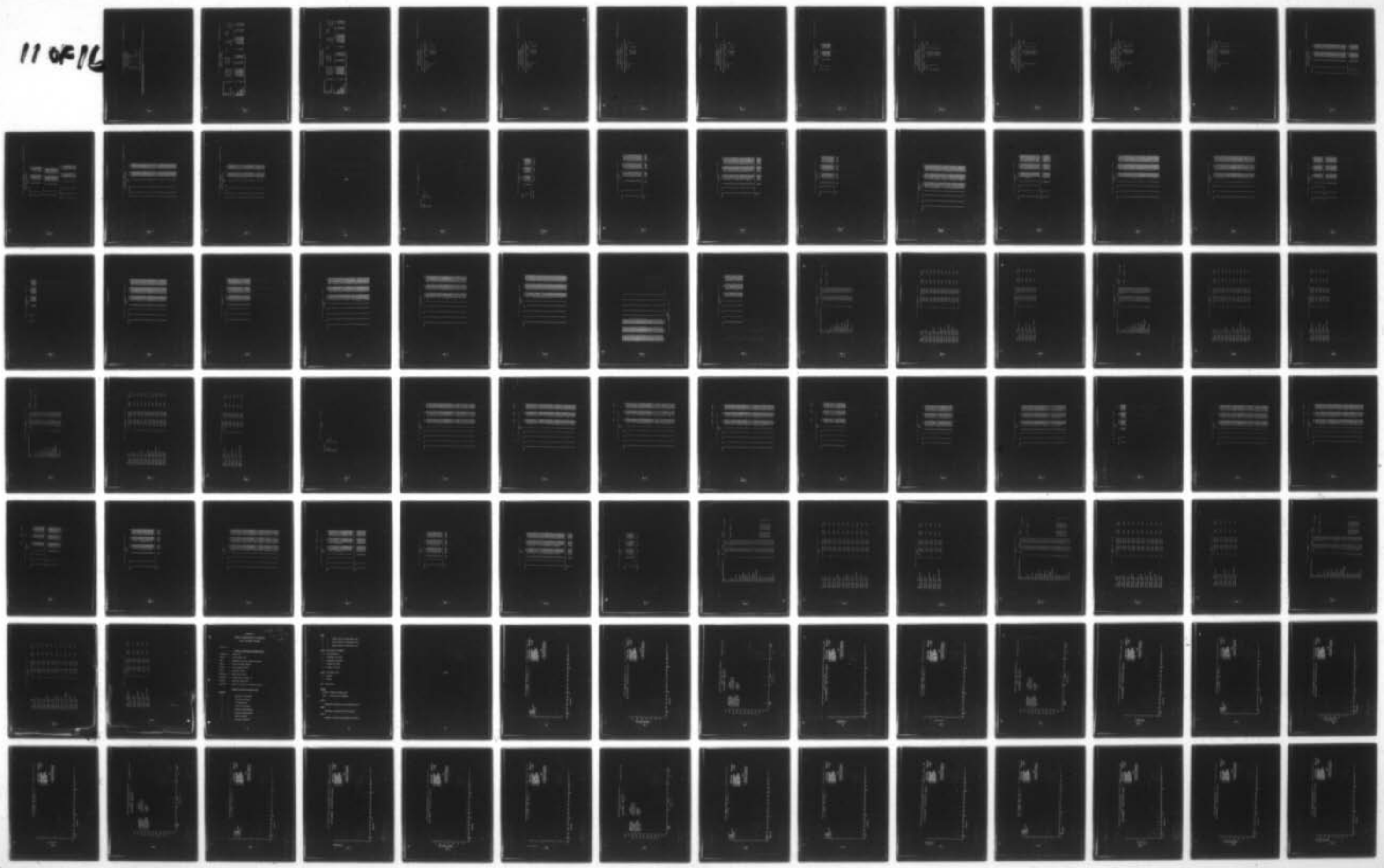
GENERAL LINEAR MODELS PROCEDURE

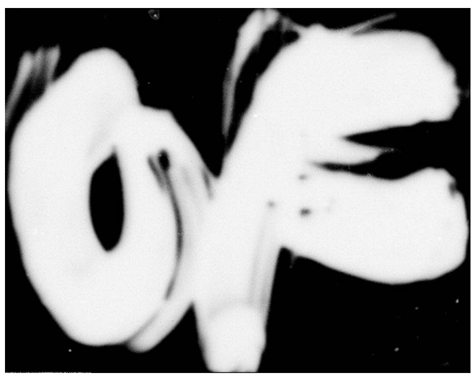
MEANS

ZONE	SPECIES	FERT	N	AIR_6
2	6	5	9	12.111111
2	7	1	9	0.000000
2	7	2	9	0.000000
2	7	3	9	0.000000
2	7	4	9	0.000000
2	7	5	9	0.000000
3	1	1	8	52.375000
3	1	2	8	74.787500
3	1	3	7	97.285714
3	1	4	7	186.757143
3	1	5	9	7.777778
3	2	1	9	166.555556
3	2	2	7	206.342857
3	2	3	8	58.750000
3	2	4	9	33.944444
3	2	5	9	104.433333
3	3	1	9	35.555556
3	3	2	9	0.000000
3	3	3	8	53.000000
3	3	4	9	297.333333
3	3	5	8	625.887500
3	4	1	9	0.000000
3	4	2	9	0.000000
3	4	3	9	0.000000
3	4	4	9	0.000000
3	4	5	9	0.000000
3	5	1	9	2.444444
3	5	2	8	19.950000
3	5	3	9	0.000000
3	5	4	7	155.728571
3	5	5	7	4.142857
3	6	1	9	157.333333
3	6	2	9	42.133333
3	6	3	9	45.455556
3	6	4	9	2.722222
3	6	5	8	16.875000
3	7	1	9	771.555556
3	7	2	9	113.322222
3	7	3	9	674.111111
3	7	4	7	327.157143
3	7	5	8	0.000000

AD-A062 867 GEORGIA UNIV BRUNSWICK MARINE EXTENSION SERVICE F/G 13/2
HABITAT DEVELOPMENT FIELD INVESTIGATIONS BUTTERMILK SOUND MARSH--ETC(U)
JUL 78 R J REIMOLD, M A HARDISKY, P C ADAMS DACW21-75-C-0074
UNCLASSIFIED WES-TR-D-78-26-APP-A NL

11 of 16





SEASON=SPRI   SEASON=SPRI

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
REP	3	1 2 3
ZONE	3	1 2 3
SPECIES	7	1 2 3 4 5 6 7
FERT	5	1 2 3 4 5

NUMBER OF OBSERVATIONS IN BY GROUP = 2205

NOTE: ALL DEPENDENT VARIABLES ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES. HOWEVER, ONLY 489 OBSERVATIONS IN BY GROUP CAN BE USED IN THIS ANALYSIS.

SEASON=SPRI   SEASON=SPRI

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: RT_BIO

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	109	442041.38588203	4055.42555855	1.75	0.0001	0.335187	804.1826
ERROR	379	876747.44847383	2313.31780600		STD DEV		RT_BIO MEAN
CORRECTED TOTAL	488	1318788.83435583			48.09696254		5.98159509

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
REP	2	1863.06404018	0.40	0.6688	2	4767.24974584	1.03	0.3579
ZONE	2	52326.01846549	11.31	0.0001	2*	40726.76354462	8.80	0.0002
REP*ZONE	4	7442.85257164	0.80	0.5230	4	7786.84410684	0.84	0.4995
SPECIES	6	29798.21914369	2.15	0.0475	6*	44832.22041615	3.23	0.0042
FERT	4	7374.62587020	0.80	0.5277	4*	11967.78372410	1.29	0.2721
SPECIES*FERT	24	68288.61751696	1.23	0.2112	24*	106536.06057134	1.92	0.0063
ZONE*SPECIES	12	85118.48909230	3.07	0.0004	12*	81152.19571000	2.92	0.0007
ZONE*FERT	8	21763.98951694	1.18	0.3123	8*	23268.66905340	1.26	0.2646
ZONE*SPECIES*FERT	47	168065.50966463	1.55	0.0154	47	168065.50966463	1.55	0.0154

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

C167

SEASON=SPR1 SEASON=SPR1

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: AIR_B

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	109	1034983.21777552	9495.25887867	1.16	0.1558	0.250320	1059.9913
ERROR	379	3099664.54091569	8178.53440875		STD DEV		AIR_B MEAN
CORRECTED TOTAL	488	4134647.75869121			90.43524981		8.53169734

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
REP	2	11500.23593200	0.70	0.4957	2	35477.18955309	2.17	0.1157
ZONE	2	108707.67936888	6.65	0.0015	2*	71851.82241120	4.39	0.0130
REP*ZONE	4	42383.33294344	1.30	0.2712	4	57898.21447020	1.77	0.1342
SPECIES	6	50333.13345479	1.03	0.4080	6*	70432.15925720	1.44	0.1999
FERT	4	22938.48247577	0.70	0.5915	4*	21307.25278129	0.65	0.6263
SPECIES*FERT	24	194409.08274759	0.99	0.4779	24*	269248.49254312	1.37	0.1157
ZONE*SPECIES	12	137596.60060839	1.40	0.1622	12*	129008.12547836	1.31	0.2074
ZONE*FERT	8	57245.32890758	0.87	0.5377	8*	39511.02924228	0.60	0.7747
ZONE*SPECIES*FERT	47	409869.34133708	1.07	0.3623	47	409869.34133708	1.07	0.3623

* NOTE: OTHER TYPE IV TESTABLE HYPOTHESES EXIST WHICH MAY YIELD DIFFERENT SS.

C168

SEASON=SPRI   SEASON=SPRI

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE RT_P10

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=379   MS=2313.32

GROUPING	MEAN	N	REP
A	8.189873	158	2
A			
A	6.420732	164	1
A			
A	3.461078	167	3

SEASON=SPRI   SEASON=SPRI

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE AIR_B

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=379   MS=8178.53

GROUPING	MEAN	N	REP
A	14.221519	158	2
A			
A	9.298780	164	1
A			
A	2.395210	167	3

C170

SEASON=SPRI   SEASON=SPRI

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE RT_BIO

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=379   MS=2313.32

GROUPING	MEAN	N	ZONE
A	24.245763	118	3
B	0.397516	161	2
B			
B	0.000000	210	1

C171

SEASON=SPRI   SEASON=SPRI

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE AIR_B

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=379   MS=8178.53

GROUPING	MEAN	N	ZONE
A	34.779661	118	3
B	0.422360	161	2
B			
B	0.000000	210	1

C172

SEASON=SPR1 SEASON=SPR1

GENERAL LINEAR MODELS PROCEDURE

MEANS

REP	ZONE	N	RT_BIO	AIR_B
1	1	70	0.0000000	0.0000000
1	2	52	1.0769231	1.1153846
1	3	42	23.7380952	34.9285714
2	1	70	0.0000000	0.0000000
2	2	53	0.1509434	0.1886792
2	3	35	36.7428571	63.9142857
3	1	70	0.0000000	0.0000000
3	2	56	0.0000000	0.0000000
3	3	41	14.0975610	9.7560976

C173

SEASON=SPRI   SEASON=SPRI

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE RT_BIO

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=379   MS=2313.32

GROUPING		MEAN	N	SPECIES
	A	18.857143	77	7
	A			
B	A	15.700000	70	2
B	A			
B	A	2.703125	64	1
B	A			
B	A	1.213115	61	5
B	A			
B	A	0.806452	62	6
B				
B		0.647887	71	3
B				
B		0.369048	84	4

C174

SEASON=SPRI   SEASON=SPRI

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE AIR_H

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=379   MS=8178.53

GROUPING	MEAN	N	SPECIES
A	29.155844	77	7
A	16.142857	70	2
A	6.071429	84	4
A	1.718750	64	1
A	1.278689	61	5
A	0.838710	62	6
A	0.661972	71	3

SEASON=SPRI   SEASON=SPRI

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE RT_BIO

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=379   MS=2313.32

GROUPING	MEAN	N	FERT
A	11.130000	100	1
A			
A	9.400000	100	3
A			
A	7.052632	95	5
A			
A	1.138614	101	2
A			
A	0.935484	93	4

C176

SEASON=SPRI   SEASON=SPRI

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE AIR_B

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=379   MS=8178.53

GROUPING	MEAN	N	FERT
A	18.900000	100	3
A	14.150000	100	1
A	7.368421	95	5
A	0.990099	101	2
A	0.720430	93	4

SEASON=SPRI   SEASON=SPRI

GENERAL LINEAR MODELS PROCEDURE

MEANS

SPECIES	FERT	N	RT_BIO	AIR_B
1	1	13	7.1538462	3.846154
1	2	14	4.2857143	3.571429
1	3	12	0.0000000	0.000000
1	4	12	1.6666667	0.833333
1	5	13	0.0000000	0.000000
2	1	15	27.2000000	28.000000
2	2	14	0.0000000	0.000000
2	3	15	0.0000000	0.000000
2	4	14	1.5000000	0.714286
2	5	12	55.8333333	58.333333
3	1	18	0.0000000	0.000000
3	2	15	0.0000000	0.000000
3	3	14	0.0000000	0.000000
3	4	12	3.8333333	3.916667
3	5	14	0.0000000	0.000000
4	1	16	1.9375000	31.875000
4	2	16	0.0000000	0.000000
4	3	18	0.0000000	0.000000
4	4	18	0.0000000	0.000000
4	5	16	0.0000000	0.000000
5	1	12	1.5833333	2.333333
5	2	12	4.5833333	4.166667
5	3	14	0.0000000	0.000000
5	4	11	0.0000000	0.000000
5	5	12	0.0000000	0.000000
6	1	13	1.5384615	1.692308
6	2	14	0.0000000	0.000000
6	3	12	2.5000000	2.500000
6	4	12	0.0000000	0.000000
6	5	11	0.0000000	0.000000
7	1	15	36.1333333	25.666667
7	2	16	0.0000000	0.000000
7	3	15	60.6666667	124.000000
7	4	14	0.0000000	0.000000
7	5	17	0.0000000	0.000000

ZONE	SPECIES	N	RT_BIO	AIR_B
1	1	30	0.0000000	0.000000
1	2	30	0.0000000	0.000000
1	3	30	0.0000000	0.000000
1	4	30	0.0000000	0.000000
1	5	30	0.0000000	0.000000
1	6	30	0.0000000	0.000000
1	7	30	0.0000000	0.000000
2	1	19	0.0000000	0.000000
2	2	26	0.0000000	0.000000
2	3	25	0.0000000	0.000000

SEASON=SPRI SEASON=SPRI

GENERAL LINEAR MODELS PROCEDURE

MEANS

ZONE	SPECIES	N	RT_BIO	AIR_B
2	4	24	0.0000000	0.000000
2	5	18	3.5555556	3.777778
2	6	23	0.0000000	0.000000
2	7	26	0.0000000	0.000000
3	1	15	11.5333333	7.333333
3	2	14	78.5000000	80.714286
3	3	16	2.8750000	2.937500
3	4	30	1.0333333	17.000000
3	5	13	0.7692308	0.769231
3	6	9	5.5555556	5.777778
3	7	21	69.1428571	106.904762

ZONE	FERT	N	RT_BIO	AIR_B
1	1	42	0.0000000	0.0000000
1	2	42	0.0000000	0.0000000
1	3	42	0.0000000	0.0000000
1	4	42	0.0000000	0.0000000
1	5	42	0.0000000	0.0000000
2	1	31	0.6129032	0.9032258
2	2	34	1.3235294	1.1764706
2	3	34	0.0000000	0.0000000
2	4	31	0.0000000	0.0000000
2	5	31	0.0000000	0.0000000
3	1	27	40.5185185	51.3703704
3	2	25	2.8000000	2.4000000
3	3	24	39.1666667	78.7500000
3	4	20	4.3500000	3.3500000
3	5	22	30.4545455	31.8181818

ZONE	SPECIES	FERT	N	RT_BIO	AIR_B
1	1	1	6	0.000000	0.000000
1	1	2	6	0.000000	0.000000
1	1	3	6	0.000000	0.000000
1	1	4	6	0.000000	0.000000
1	1	5	6	0.000000	0.000000
1	2	1	6	0.000000	0.000000
1	2	2	6	0.000000	0.000000
1	2	3	6	0.000000	0.000000
1	2	4	6	0.000000	0.000000
1	2	5	6	0.000000	0.000000
1	3	1	6	0.000000	0.000000
1	3	2	6	0.000000	0.000000
1	3	3	6	0.000000	0.000000
1	3	4	6	0.000000	0.000000
1	3	5	6	0.000000	0.000000

SEASON=SPRI   SEASON=SPRI

GENERAL LINEAR MODELS PROCEDURE

MEANS

ZONE	SPECIES	FERT	N	RT_EIO	AIR_B
1	4	1	6	0.000000	0.000000
1	4	2	6	0.000000	0.000000
1	4	3	6	0.000000	0.000000
1	4	4	6	0.000000	0.000000
1	4	5	6	0.000000	0.000000
1	5	1	6	0.000000	0.000000
1	5	2	6	0.000000	0.000000
1	5	3	6	0.000000	0.000000
1	5	4	6	0.000000	0.000000
1	5	5	6	0.000000	0.000000
1	6	1	6	0.000000	0.000000
1	6	2	6	0.000000	0.000000
1	6	3	6	0.000000	0.000000
1	6	4	6	0.000000	0.000000
1	6	5	6	0.000000	0.000000
1	7	1	6	0.000000	0.000000
1	7	2	6	0.000000	0.000000
1	7	3	6	0.000000	0.000000
1	7	4	6	0.000000	0.000000
1	7	5	6	0.000000	0.000000
2	1	1	3	0.000000	0.000000
2	1	2	4	0.000000	0.000000
2	1	3	4	0.000000	0.000000
2	1	4	4	0.000000	0.000000
2	1	5	4	0.000000	0.000000
2	2	1	6	0.000000	0.000000
2	2	2	6	0.000000	0.000000
2	2	3	6	0.000000	0.000000
2	2	4	5	0.000000	0.000000
2	2	5	3	0.000000	0.000000
2	3	1	6	0.000000	0.000000
2	3	2	4	0.000000	0.000000
2	3	3	6	0.000000	0.000000
2	3	4	3	0.000000	0.000000
2	3	5	6	0.000000	0.000000
2	4	1	4	0.000000	0.000000
2	4	2	4	0.000000	0.000000
2	4	3	6	0.000000	0.000000
2	4	4	6	0.000000	0.000000
2	4	5	4	0.000000	0.000000
2	5	1	3	6.333333	9.333333
2	5	2	4	11.250000	10.000000
2	5	3	4	0.000000	0.000000
2	5	4	4	0.000000	0.000000
2	5	5	3	0.000000	0.000000
2	6	1	4	0.000000	0.000000
2	6	2	6	0.000000	0.000000
2	6	3	4	0.000000	0.000000
2	6	4	4	0.000000	0.000000

C180

SEASON=SPRI   SEASON=SPRI

GENERAL LINEAR MODELS PROCEDURE

MEANS

ZONE	SPECIES	FERT	N	RT_BIO	AIR_B
2	6	5	5	0.000000	0.000000
2	7	1	5	0.000000	0.000000
2	7	2	6	0.000000	0.000000
2	7	3	4	0.000000	0.000000
2	7	4	5	0.000000	0.000000
2	7	5	6	0.000000	0.000000
3	1	1	4	23.250000	12.500000
3	1	2	4	15.000000	12.500000
3	1	3	2	0.000000	0.000000
3	1	4	2	10.000000	5.000000
3	1	5	3	0.000000	0.000000
3	2	1	3	136.000000	140.000000
3	2	2	2	0.000000	0.000000
3	2	3	3	0.000000	0.000000
3	2	4	3	7.000000	3.333333
3	2	5	3	223.333333	233.333333
3	3	1	4	0.000000	0.000000
3	3	2	5	0.000000	0.000000
3	3	3	2	0.000000	0.000000
3	3	4	3	15.333333	15.666667
3	3	5	2	0.000000	0.000000
3	4	1	6	5.166667	85.000000
3	4	2	6	0.000000	0.000000
3	4	3	6	0.000000	0.000000
3	4	4	6	0.000000	0.000000
3	4	5	6	0.000000	0.000000
3	5	1	3	0.000000	0.000000
3	5	2	2	5.000000	5.000000
3	5	3	4	0.000000	0.000000
3	5	4	1	0.000000	0.000000
3	5	5	3	0.000000	0.000000
3	6	1	3	6.666667	7.333333
3	6	2	2	0.000000	0.000000
3	6	3	2	15.000000	15.000000
3	6	4	2	0.000000	0.000000
3	7	1	4	135.500000	96.250000
3	7	2	4	0.000000	0.000000
3	7	3	5	182.000000	372.000000
3	7	4	3	0.000000	0.000000
3	7	5	5	0.000000	0.000000

PART 4

STATISTICAL ANALYSIS SYSTEM
YR=77 DAY=305

DATA SET PASS

CLASSES	VALUES
SPECIES	1 2 3 4 5 6 7 8
FERT	1 2 3 4 5
PROP	1 2
REP	1 2 3
ZONE	1 2 3

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M
YR=77 DAY=305

MEANS

SPECIES	N	STEM_DEN	CRAB_B	ELEV
1	90	34.311111	8.6388889	0.695666667
2	90	247.466667	23.0777779	0.683600000
3	90	42.322222	10.6877778	0.692500000
4	90	193.666667	10.3888889	0.591333333
5	90	98.066667	10.2755556	0.791200000
6	90	23.300000	7.6244444	0.703922222
7	90	631.444444	10.6711111	0.611711111
8	90	16.300000	6.0666667	0.742344444
OVERALL MEANS	720	162.359722	10.9938889	0.689034722

C184

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M
YR=77 DAY=305

MEANS

SPECIES	ZONE	N	STEM_DEN	CRAB_B	ELEV
1	1	30	0.00000	0.0000000	0.00000000
1	2	30	0.00000	4.3600000	0.34640000
1	3	30	104.73333	21.5566667	1.74060000
2	1	30	0.00000	0.0000000	0.00000000
2	2	30	0.06667	3.1600000	0.28563333
2	3	30	742.33333	66.1333333	1.70516667
3	1	30	0.00000	0.0000000	0.00000000
3	2	30	0.00000	4.1000000	0.36063333
3	3	30	126.06667	27.9633333	1.71686667
4	1	30	0.00000	0.0000000	0.00000000
4	2	30	0.00000	2.9600000	0.31373333
4	3	30	599.00000	29.7066667	1.46026667
5	1	30	78.00000	0.0000000	0.05760000
5	2	30	180.86667	8.6900000	0.87930000
5	3	30	35.33333	22.1366667	1.43570000
6	1	30	0.00000	0.0000000	0.00000000
6	2	30	8.00000	5.0733333	0.45326667
6	3	30	79.00000	17.8000000	1.65850000
7	1	30	0.00000	0.0000000	0.00000000
7	2	30	0.00000	0.8500000	0.24186667
7	3	30	1894.33333	31.1633333	1.59326667
8	1	30	0.00000	0.0000000	0.00000000
8	2	30	48.66667	7.3233333	0.66856667
8	3	30	0.23333	10.8766667	1.53846667

ZONE	N	STEM_DEN	CRAB_B	ELEV
1	240	9.75000	0.0000000	0.00720000
2	240	29.70000	4.5645833	0.44617500
3	240	447.62917	28.4170833	1.62372917

C185

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

YR=77 DAY=305

MEANS

SPECIES	FERT	N	STEM_DEN	CRAB_B	ELEV
1	1	18	27.77778	12.8055556	0.859444444
1	2	18	22.77778	5.0000000	0.688888889
1	3	18	79.38889	11.8500000	0.767166667
1	4	18	32.22222	9.0555556	0.658333333
1	5	18	13.38889	4.4833333	0.504500000
2	1	18	196.11111	26.1111111	0.662055556
2	2	18	403.33333	17.2444444	0.876111111
2	3	18	103.38889	19.4444444	0.430833333
2	4	18	195.05556	22.7777778	0.675055556
2	5	18	339.44444	29.9111111	0.773944444
3	1	18	4.55556	7.3833333	0.682111111
3	2	18	0.00000	0.7666667	0.361277778
3	3	18	1.27778	16.1111111	0.869000000
3	4	18	70.61111	15.1888889	0.809833333
3	5	18	133.66667	13.9888889	0.740277778
4	1	18	194.44444	6.7111111	0.718500000
4	2	18	116.66667	1.1222222	0.376388889
4	3	18	111.11111	11.9888889	0.519888889
4	4	18	483.33333	22.8500000	0.759555556
4	5	18	92.77778	11.7722222	0.581833333
5	1	18	116.11111	13.5166667	0.973222222
5	2	18	163.33889	6.7555556	0.828777778
5	3	18	117.27778	3.9555556	0.584666667
5	4	18	47.05556	14.0555556	0.816833333
5	5	18	46.50000	16.1444444	0.755500000
6	1	18	17.05556	9.4444444	0.866722222
6	2	18	16.66667	10.0111111	0.727444444
6	3	18	16.11111	8.2111111	0.684444444
6	4	18	75.05556	8.6388889	0.567555556
6	5	18	20.11111	1.8166667	0.673444444
7	1	18	336.66667	12.9111111	0.493388889
7	2	18	861.11111	9.5277778	0.614500000
7	3	18	740.00000	11.3444444	0.739388889
7	4	18	1008.33333	12.2611111	0.696388889
7	5	18	211.11111	7.3111111	0.514888889
8	1	18	13.88889	3.9000000	0.829000000
8	2	18	24.44444	10.1500000	0.751111111
8	3	18	0.00000	4.1000000	0.687000000
8	4	18	0.38889	9.6333333	0.801388889
8	5	18	42.77778	2.5500000	0.643222222

FERT	N	STEM_DEN	CRAB_B	ELEV
1	144	113.32639	11.5979167	0.760180556
2	144	201.04861	7.5722222	0.653125000
3	144	145.94444	10.5006944	0.660298611
4	144	239.00694	14.3013889	0.723118056
5	144	112.47222	10.9972222	0.648451389

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M
YR=77 DAY=305

MEANS

SPECIES	PROP	N	STEM_DEN	CRAB_B	ELEV
1	1	45	49.33333	11.8555556	0.661056667
1	2	45	20.48889	5.4222222	0.730266667
2	1	45	275.60000	18.2511111	0.727688889
2	2	45	219.33333	27.9444444	0.639511111
3	1	45	51.60000	11.2355556	0.625533333
3	2	45	32.44444	10.1400000	0.759466667
4	1	45	399.33333	14.1800000	0.611244444
4	2	45	0.00000	7.5977778	0.571422222
5	1	45	145.60000	13.1866667	0.774177778
5	2	45	50.53333	7.3644444	0.808222222
6	1	45	45.73333	4.6577778	0.555822222
6	2	45	12.26667	10.5911111	0.852022222
7	1	45	664.44444	12.1288889	0.634577778
7	2	45	599.44444	9.2133333	0.588844444
8	1	45	5.55556	5.0000000	0.710288889
8	2	45	27.04444	7.1333333	0.774400000

PROP		N	STEM_DEN	CRAB_B	ELEV
1		360	204.65000	11.3119444	0.662550000
2		360	120.06944	10.6758333	0.715519444

C187

STATISTICAL ANALYSIS SYSTEM
YR=77 DAY=305

MEANS

SPECIES	FERT	PROP	N	STEM_DEN	CRAB_B	ELEV
1	1	1	9	28.888889	21.3444444	0.77588889
1	1	2	9	26.666667	4.2666667	0.94300000
1	2	1	9	25.555556	5.5555556	0.43011111
1	2	2	9	20.000000	4.4444444	0.94766667
1	3	1	9	152.222222	11.1111111	0.68144444
1	3	2	9	4.555556	12.5888889	0.85288889
1	4	1	9	13.333333	14.6000000	0.73544444
1	4	2	9	51.111111	3.5111111	0.58122222
1	5	1	9	26.666667	6.6666667	0.68244444
1	5	2	9	0.111111	2.3000000	0.32655556
2	1	1	9	180.000000	18.8888889	0.65733333
2	1	2	9	212.222222	33.3333333	0.66677778
2	2	1	9	411.111111	13.3333333	0.68166667
2	2	2	9	395.555556	21.1555556	0.87055556
2	3	1	9	2.333333	10.0000000	0.42077778
2	3	2	9	204.444444	28.8888889	0.44088889
2	4	1	9	310.111111	14.4444444	0.89255556
2	4	2	9	80.000000	31.1111111	0.45755556
2	5	1	9	474.444444	34.5888889	0.78611111
2	5	2	9	204.444444	25.2333333	0.76177778
3	1	1	9	0.111111	9.2111111	0.69988889
3	1	2	9	9.000000	5.5555556	0.66433333
3	2	1	9	0.000000	0.1000000	0.24677778
3	2	2	9	0.000000	1.4333333	0.47577778
3	3	1	9	0.000000	13.3333333	0.73822222
3	3	2	9	2.555556	18.8888889	0.99977778
3	4	1	9	0.111111	10.2000000	0.81388889
3	4	2	9	141.111111	20.1777778	0.80577778
3	5	1	9	257.777778	21.3333333	0.62888889
3	5	2	9	9.555556	4.6444444	0.85166667
4	1	1	9	388.888889	11.1111111	0.66322222
4	1	2	9	0.000000	2.3111111	0.77377778
4	2	1	9	233.333333	2.1000000	0.66455556
4	2	2	9	0.000000	0.1444444	0.08922222
4	3	1	9	222.222222	8.8888889	0.19077778
4	3	2	9	0.000000	15.0888889	0.84900000
4	4	1	9	966.666667	26.8111111	0.77044444
4	4	2	9	0.000000	18.8888889	0.74866667
4	5	1	9	185.555556	21.9888889	0.76722222
4	5	2	9	0.000000	1.5555556	0.39644444
5	1	1	9	188.888889	16.6666667	0.99711111
5	1	2	9	43.333333	10.3666667	0.94333333
5	2	1	9	255.555556	7.9555556	0.76044444
5	2	2	9	71.222222	5.5555556	0.99711111
5	3	1	9	145.666667	1.2888889	0.65644444
5	3	2	9	88.888889	0.6222222	0.51288889
5	4	1	9	67.777778	17.8000000	0.70388889
5	4	2	9	26.333333	10.2111111	0.92977778
5	5	1	9	70.111111	22.2222222	0.75300000
5	5	2	9	22.888889	10.0666667	0.75800000
6	1	1	9	12.000000	8.8888889	0.72644444
6	1	2	9	22.111111	10.3000000	1.00700000
6	2	1	9	17.777778	2.2444444	0.58944444
6	2	2	9	15.555556	17.7777778	0.86544444

C188

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M
YR=77 DAY=305

MEANS

SPECIES	FERT	PROP	N	STEM_DEN	CRAB_B	ELEV
6	3	1	9	18.88889	4.9666667	0.591888889
6	3	2	9	13.33333	11.4555556	0.777000000
6	4	1	9	153.00000	5.5555556	0.381444444
6	4	2	9	0.11111	11.7222222	0.753666667
6	5	1	9	33.00000	1.6333333	0.489888889
6	5	2	9	10.22222	2.0000000	0.857000000
7	1	1	9	289.88889	5.8222222	0.502333333
7	1	2	9	384.44444	20.0000000	0.484444444
7	2	1	9	611.11111	12.3111111	0.669222222
7	2	2	9	1111.11111	6.7444444	0.559777778
7	3	1	9	488.88889	6.9555556	0.665444444
7	3	2	9	991.11111	15.7333333	0.813333333
7	4	1	9	1511.11111	22.2222222	0.688222222
7	4	2	9	505.55556	2.3000000	0.704555556
7	5	1	9	422.22222	13.3333333	0.647666667
7	5	2	9	0.00000	1.2888889	0.382111111
8	1	1	9	27.77778	6.0333333	0.823888889
8	1	2	9	0.00000	1.7666667	0.834111111
8	2	1	9	0.00000	5.8555556	0.528000000
8	2	2	9	48.88889	14.4444444	0.974222222
8	3	1	9	0.00000	5.9777778	0.949111111
8	3	2	9	0.00000	2.7222222	0.424888889
8	4	1	9	0.00000	4.7333333	0.717444444
8	4	2	9	0.77778	14.5333333	0.885333333
8	5	1	9	0.00000	2.4000000	0.533000000
8	5	2	9	85.55556	2.7000000	0.753444444

FERT	PROP	N	STEM_DEN	CRAB_B	ELEV
1	1	72	139.43056	12.2458333	0.730763889
1	2	72	87.22222	10.9500000	0.789597222
2	1	72	194.30556	6.1319444	0.596277778
2	2	72	237.79167	8.9625000	0.709972222
3	1	72	128.77778	7.8152778	0.611763889
3	2	72	163.11111	13.1861111	0.708833333
4	1	72	377.38889	14.5458333	0.712916667
4	2	72	100.62500	14.0569444	0.733319444
5	1	72	183.34722	15.7708333	0.661027778
5	2	72	41.59722	6.2236111	0.635875000

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S T A T I S T I C A L   A N A L Y S I S   S Y S T E M
YR=77 DAY=305

MEANS

SPECIES	FERT	ZONE	N	STEM_DEN	CRAB_B	ELEV
1	1	1	6	0.00000	0.0000000	0.00000000
1	1	2	6	0.00000	1.4666667	0.36483333
1	1	3	6	83.33333	36.9500000	2.19350000
1	2	1	6	0.00000	0.0000000	0.00000000
1	2	2	6	0.00000	5.0000000	0.44316667
1	2	3	6	68.33333	10.0000000	1.62350000
1	3	1	6	0.00000	0.0000000	0.00000000
1	3	2	6	0.00000	11.6666667	0.37150000
1	3	3	6	235.16667	23.8833333	1.93000000
1	4	1	6	0.00000	0.0000000	0.00000000
1	4	2	6	0.00000	0.3333333	0.39050000
1	4	3	6	96.66667	26.8333333	1.58450000
1	5	1	6	0.00000	0.0000000	0.00000000
1	5	2	6	0.00000	3.3333333	0.14200000
1	5	3	6	40.16667	10.1166667	1.37150000
2	1	1	6	0.00000	0.0000000	0.00000000
2	1	2	6	0.00000	0.0000000	0.00000000
2	1	3	6	588.33333	78.3333333	1.98616667
2	2	1	6	0.00000	0.0000000	0.00000000
2	2	2	6	0.00000	11.7333333	0.63166667
2	2	3	6	1210.00000	40.0000000	1.99666667
2	3	1	6	0.00000	0.0000000	0.00000000
2	3	2	6	0.16667	3.3333333	0.25950000
2	3	3	6	310.00000	55.0000000	1.03300000
2	4	1	6	0.00000	0.0000000	0.00000000
2	4	2	6	0.16667	0.0000000	0.25916667
2	4	3	6	595.00000	68.3333333	1.76600000
2	5	1	6	0.00000	0.0000000	0.00000000
2	5	2	6	0.00000	0.7333333	0.27783333
2	5	3	6	1018.33333	89.0000000	2.04400000
3	1	1	6	0.00000	0.0000000	0.00000000
3	1	2	6	0.00000	1.7833333	0.17633333
3	1	3	6	13.66667	20.3666667	1.87000000
3	2	1	6	0.00000	0.0000000	0.00000000
3	2	2	6	0.00000	0.0000000	0.00000000
3	2	3	6	0.00000	2.3000000	1.08383333
3	3	1	6	0.00000	0.0000000	0.00000000
3	3	2	6	0.00000	15.0000000	0.82466667
3	3	3	6	3.83333	33.3333333	1.78233333
3	4	1	6	0.00000	0.0000000	0.00000000
3	4	2	6	0.00000	1.9333333	0.45900000
3	4	3	6	211.83333	43.6333333	1.97050000
3	5	1	6	0.00000	0.0000000	0.00000000
3	5	2	6	0.00000	1.7833333	0.34316667
3	5	3	6	401.00000	40.1833333	1.87766667
4	1	1	6	0.00000	0.0000000	0.00000000
4	1	2	6	0.00000	0.3666667	0.21256667
4	1	3	6	583.33333	19.7666667	1.94283333
4	2	1	6	0.00000	0.0000000	0.00000000
4	2	2	6	0.00000	0.2166667	0.13383333
4	2	3	6	350.00000	3.1500000	0.99633333
4	3	1	6	0.00000	0.0000000	0.00000000
4	3	2	6	0.00000	2.1166667	0.32266667
4	3	3	6	333.33333	33.8500000	1.23700000

STATISTICAL ANALYSIS SYSTEM
YR=77 DAY=305

MEANS

SPECIES	FERT	ZONE	N	STEM_DEN	CRAB_B	ELEV
4	4	1	6	0.00000	0.0000000	0.00000000
4	4	2	6	0.00000	11.8833333	0.74733333
4	4	3	6	1450.00000	56.6666667	1.53133333
4	5	1	6	0.00000	0.0000000	0.00000000
4	5	2	6	0.00000	0.2166667	0.15216667
4	5	3	6	278.33333	35.1000000	1.59333333
5	1	1	6	228.33333	0.0000000	0.14250000
5	1	2	6	116.66667	20.3333333	1.05266667
5	1	3	6	3.33333	20.2166667	1.71550000
5	2	1	6	161.66667	0.0000000	0.14550000
5	2	2	6	258.33333	3.6000000	0.77250000
5	2	3	6	70.16667	16.6666667	1.56633333
5	3	1	6	0.00000	0.0000000	0.00000000
5	3	2	6	351.66667	0.9000000	0.71216667
5	3	3	6	0.16667	1.9666667	1.04183333
5	4	1	6	0.00000	0.0000000	0.00000000
5	4	2	6	61.66667	6.8500000	0.91500000
5	4	3	6	79.50000	35.1666667	1.53550000
5	5	1	6	0.00000	0.0000000	0.00000000
5	5	2	6	116.00000	11.7666667	0.94416667
5	5	3	6	23.50000	36.6666667	1.32233333
6	1	1	6	0.00000	0.0000000	0.00000000
6	1	2	6	25.00000	3.3333333	0.41550000
6	1	3	6	26.16667	25.0000000	2.18466667
6	2	1	6	0.00000	0.0000000	0.00000000
6	2	2	6	0.00000	18.3666667	0.63233333
6	2	3	6	50.00000	11.6666667	1.55000000
6	3	1	6	0.00000	0.0000000	0.00000000
6	3	2	6	0.00000	1.3000000	0.47050000
6	3	3	6	48.33333	23.3333333	1.57683333
6	4	1	6	0.00000	0.0000000	0.00000000
6	4	2	6	0.00000	0.3666667	0.20883333
6	4	3	6	225.16667	25.5500000	1.49383333
6	5	1	6	0.00000	0.0000000	0.00000000
6	5	2	6	15.00000	2.0000000	0.53316667
6	5	3	6	45.33333	3.4500000	1.48716667
7	1	1	6	0.00000	0.0000000	0.00000000
7	1	2	6	0.00000	0.4000000	0.15466667
7	1	3	6	1010.00000	38.3333333	1.32550000
7	2	1	6	0.00000	0.0000000	0.00000000
7	2	2	6	0.00000	0.2500000	0.41050000
7	2	3	6	2583.33333	28.3333333	1.43300000
7	3	1	6	0.00000	0.0000000	0.00000000
7	3	2	6	0.00000	1.9333333	0.46250000
7	3	3	6	2220.00000	32.1000000	1.75566667
7	4	1	6	0.00000	0.0000000	0.00000000
7	4	2	6	0.00000	1.6666667	0.18166667
7	4	3	6	1025.00000	15.1166667	1.90750000
7	5	1	6	0.00000	0.0000000	0.00000000
7	5	2	6	0.00000	0.0000000	0.00000000
7	5	3	6	633.33333	21.9333333	1.54466667
8	1	1	6	0.00000	0.0000000	0.00000000
8	1	2	6	41.66667	2.2166667	0.72016667
8	1	3	6	0.00000	9.4833333	1.76633333

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

YR=77 DAY=305

MEANS

SPECIES	FERT	ZONE	N	STEM_DEN	CRAB_B	ELEV
8	2	1	6	0.00000	0.0000000	0.00000000
8	2	2	6	73.33333	6.7333333	0.67650000
8	2	3	6	0.00000	23.7166667	1.57683333
8	3	1	6	0.00000	0.0000000	0.00000000
8	3	2	6	0.00000	8.3333333	0.41733333
8	3	3	6	0.00000	3.9666667	1.64366667
8	4	1	6	0.00000	0.0000000	0.00000000
8	4	2	6	0.00000	18.6000000	0.89500000
8	4	3	6	1.16667	10.3000000	1.50916667
8	5	1	6	0.00000	0.0000000	0.00000000
8	5	2	6	128.33333	0.7333333	0.73383333
8	5	3	6	0.00000	6.9166667	1.19583333

FERT	ZONE	N	STEM_DEN	CRAB_B	ELEV
1	1	48	28.54167	0.0000000	0.01781250
1	2	48	22.91667	3.7375000	0.38960417
1	3	48	288.52083	31.0562500	1.87312500
2	1	48	20.20833	0.0000000	0.01818750
2	2	48	41.45833	5.7375000	0.46256250
2	3	48	541.47917	16.9791667	1.47862500
3	1	48	0.00000	0.0000000	0.00000000
3	2	48	43.97917	5.5729167	0.48085417
3	3	48	393.85417	25.9291667	1.50034167
4	1	48	0.00000	0.0000000	0.00000000
4	2	48	7.72917	5.2041667	0.50706250
4	3	48	709.29167	37.7000000	1.66229167
5	1	48	0.00000	0.0000000	0.00000000
5	2	48	32.41667	2.5708333	0.39079167
5	3	48	305.00000	30.4208333	1.55456250

STATISTICAL ANALYSIS SYSTEM
YR=77 DAY=305

MEANS

PROP	ZONE	N	STEM_DEN	CRAB_B	ELEV
1	1	120	19.50000	0.0000000	0.01440000
1	2	120	33.76667	2.9208333	0.34424167
1	3	120	560.68333	31.0150000	1.62900833
2	1	120	0.00000	0.0000000	0.00000000
2	2	120	25.63333	6.2083333	0.54810833
2	3	120	334.57500	25.8191667	1.59845000

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M
YR=77 DAY=305

MEANS

SPECIES	PROP	ZONE	N	STEM_DEN	CRAB_B	ELEV
1	1	1	15	0.00000	0.0000000	0.00000000
1	1	2	15	0.00000	0.0533333	0.11366667
1	1	3	15	148.00000	35.5133333	1.80953333
1	2	1	15	0.00000	0.0000000	0.00000000
1	2	2	15	0.00000	9.6666667	0.57913333
1	2	3	15	61.46667	7.6000000	1.61166667
2	1	1	15	0.00000	0.0000000	0.00000000
2	1	2	15	0.13333	2.3866667	0.34813333
2	1	3	15	826.66667	52.6666667	1.83493333
2	2	1	15	0.00000	0.0000000	0.00000000
2	2	2	15	0.00000	4.2333333	0.22313333
2	2	3	15	658.00000	79.6000000	1.69540000
3	1	1	15	0.00000	0.0000000	0.00000000
3	1	2	15	0.00000	2.7133333	0.31913333
3	1	3	15	154.80000	30.9933333	1.55746667
3	2	1	15	0.00000	0.0000000	0.00000000
3	2	2	15	0.00000	5.4866667	0.40213333
3	2	3	15	97.33333	24.9333333	1.87626667
4	1	1	15	0.00000	0.0000000	0.00000000
4	1	2	15	0.00000	0.1733333	0.16426667
4	1	3	15	1193.00000	42.3666667	1.60946667
4	2	1	15	0.00000	0.0000000	0.00000000
4	2	2	15	0.00000	5.7466667	0.46320000
4	2	3	15	0.00000	17.0466667	1.25106667
5	1	1	15	156.00000	0.0000000	0.11520000
5	1	2	15	253.33333	12.8933333	0.91833333
5	1	3	15	27.46667	26.6666667	1.28900000
5	2	1	15	0.00000	0.0000000	0.00000000
5	2	2	15	108.40000	4.4866667	0.84026667
5	2	3	15	43.20000	17.6066667	1.58440000
6	1	1	15	0.00000	0.0000000	0.00000000
6	1	2	15	0.00000	0.9933333	0.24640000
6	1	3	15	137.20000	12.9800000	1.42106667
6	2	1	15	0.00000	0.0000000	0.00000000
6	2	2	15	16.00000	9.1533333	0.66013333
6	2	3	15	20.80000	27.6200000	1.89593333
7	1	1	15	0.00000	0.0000000	0.00000000
7	1	2	15	0.00000	0.2133333	0.12073333
7	1	3	15	1993.33333	36.1733333	1.76280000
7	2	1	15	0.00000	0.0000000	0.00000000
7	2	2	15	0.00000	1.4866667	0.36280000
7	2	3	15	1795.33333	26.1533333	1.40373333
8	1	1	15	0.00000	0.0000000	0.00000000
8	1	2	15	16.66667	4.2400000	0.52306667
8	1	3	15	0.00000	10.7600000	1.60780000
8	2	1	15	0.00000	0.0000000	0.00000000
8	2	2	15	80.66667	10.4066667	0.85406667
8	2	3	15	0.46667	10.9933333	1.46913333

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M
YR=77 DAY=305

MEANS

FERT	PROP	ZONE	N	STEM_DEN	CRAB_B	ELEV
1	1	1	24	57.08333	0.0000000	0.03562500
1	1	2	24	23.33333	4.7291667	0.32795833
1	1	3	24	337.87500	32.0083333	1.82870833
1	2	1	24	0.00000	0.0000000	0.00000000
1	2	2	24	22.50000	2.7458333	0.45125000
1	2	3	24	239.16667	30.1041667	1.91754167
2	1	1	24	40.41667	0.0000000	0.03637500
2	1	2	24	54.16667	0.9583333	0.26916667
2	1	3	24	438.33333	17.5875000	1.48329167
2	2	1	24	0.00000	0.0000000	0.00000000
2	2	2	24	28.75000	10.5166667	0.65595833
2	2	3	24	594.62500	16.3708333	1.47395833
3	1	1	24	0.00000	0.0000000	0.00000000
3	1	2	24	54.62500	4.0125000	0.40204167
3	1	3	24	331.70833	19.4333333	1.43325000
3	2	1	24	0.00000	0.0000000	0.00000000
3	2	2	24	33.33333	7.1333333	0.55966667
3	2	3	24	456.00000	32.4250000	1.56683333
4	1	1	24	0.00000	0.0000000	0.00000000
4	1	2	24	14.20833	2.2291667	0.43708333
4	1	3	24	1117.95833	41.4083333	1.70166667
4	2	1	24	0.00000	0.0000000	0.00000000
4	2	2	24	1.25000	8.1791667	0.57704167
4	2	3	24	330.62500	33.9916667	1.62291667
5	1	1	24	0.00000	0.0000000	0.00000000
5	1	2	24	22.50000	2.6750000	0.28495833
5	1	3	24	527.54167	44.6375000	1.69812500
5	2	1	24	0.00000	0.0000000	0.00000000
5	2	2	24	42.33333	2.4666667	0.49662500
5	2	3	24	82.45833	16.2041667	1.41100000

STATISTICAL ANALYSIS SYSTEM
YR=77 DAY=305

MEANS

SPECIES	FERT	PROP	ZONE	N	STEM_DEN	CRAB_B	ELEV
1	1	1	1	3	0.00000	0.000000	0.00000000
1	1	1	2	3	0.00000	0.133333	0.29333333
1	1	1	3	3	86.66667	63.900000	2.03433333
1	1	2	1	3	0.00000	0.000000	0.00000000
1	1	2	2	3	0.00000	2.800000	0.47633333
1	1	2	3	3	80.00000	13.000000	2.35266667
1	2	1	1	3	0.00000	0.000000	0.00000000
1	2	1	2	3	0.00000	0.000000	0.00000000
1	2	1	3	3	76.66667	16.666667	1.29033333
1	2	2	1	3	0.00000	0.000000	0.00000000
1	2	2	2	3	0.00000	10.000000	0.88633333
1	2	2	3	3	60.00000	3.333333	1.95666667
1	3	1	1	3	0.00000	0.000000	0.00000000
1	3	1	2	3	0.00000	0.000000	0.00000000
1	3	1	3	3	456.66667	33.333333	2.04433333
1	3	2	1	3	0.00000	0.000000	0.00000000
1	3	2	2	3	0.00000	23.333333	0.74300000
1	3	2	3	3	13.66667	14.433333	1.81566667
1	4	1	1	3	0.00000	0.000000	0.00000000
1	4	1	2	3	0.00000	0.133333	0.27500000
1	4	1	3	3	40.00000	43.666667	1.93133333
1	4	2	1	3	0.00000	0.000000	0.00000000
1	4	2	2	3	0.00000	0.533333	0.50600000
1	4	2	3	3	153.33333	10.000000	1.23766667
1	5	1	1	3	0.00000	0.000000	0.00000000
1	5	1	2	3	0.00000	0.000000	0.00000000
1	5	1	3	3	80.00000	20.000000	2.04733333
1	5	2	1	3	0.00000	0.000000	0.00000000
1	5	2	2	3	0.00000	6.666667	0.28400000
1	5	2	3	3	0.33333	0.233333	0.69566667
2	1	1	1	3	0.00000	0.000000	0.00000000
2	1	1	2	3	0.00000	0.000000	0.00000000
2	1	1	3	3	540.00000	56.666667	1.97200000
2	1	2	1	3	0.00000	0.000000	0.00000000
2	1	2	2	3	0.00000	0.000000	0.00000000
2	1	2	3	3	636.66667	100.000000	2.00033333
2	2	1	1	3	0.00000	0.000000	0.00000000
2	2	1	2	3	0.00000	3.333333	0.44033333
2	2	1	3	3	1233.33333	36.666667	2.20466667
2	2	2	1	3	0.00000	0.000000	0.00000000
2	2	2	2	3	0.00000	20.133333	0.82300000
2	2	2	3	3	1186.66667	43.333333	1.78866667
2	3	1	1	3	0.00000	0.000000	0.00000000
2	3	1	2	3	0.33333	6.666667	0.51900000
2	3	1	3	3	6.66667	23.333333	0.74333333
2	3	2	1	3	0.00000	0.000000	0.00000000
2	3	2	2	3	0.00000	0.000000	0.00000000
2	3	2	3	3	613.33333	86.666667	1.32266667
2	4	1	1	3	0.00000	0.000000	0.00000000
2	4	1	2	3	0.33333	0.000000	0.51833333
2	4	1	3	3	930.00000	43.333333	2.15933333
2	4	2	1	3	0.00000	0.000000	0.00000000
2	4	2	2	3	0.00000	0.000000	0.00000000
2	4	2	3	3	240.00000	93.333333	1.37266667

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M
YR=77 DAY=305

MEANS

SPECIES	FERT	PROP	ZONE	N	STEM_DEN	CRAB_B	ELEV
2	5	1	1	3	0.00000	0.000000	0.00000000
2	5	1	2	3	0.00000	0.433333	0.26300000
2	5	1	3	3	1423.33333	103.333333	2.09533333
2	5	2	1	3	0.00000	0.000000	0.00000000
2	5	2	2	3	0.00000	1.033333	0.29266667
2	5	2	3	3	613.33333	74.666667	1.99266667
3	1	1	1	3	0.00000	0.000000	0.00000000
3	1	1	2	3	0.00000	3.566667	0.35266667
3	1	1	3	3	0.33333	24.066667	1.74700000
3	1	2	1	3	0.00000	0.000000	0.00000000
3	1	2	2	3	0.00000	0.000000	0.00000000
3	1	2	3	3	27.00000	16.666667	1.49300000
3	2	1	1	3	0.00000	0.000000	0.00000000
3	2	1	2	3	0.00000	0.000000	0.00000000
3	2	1	3	3	0.00000	0.300000	0.74033333
3	2	2	1	3	0.00000	0.000000	0.00000000
3	2	2	2	3	0.00000	0.000000	0.00000000
3	2	2	3	3	0.00000	4.500000	1.42733333
3	3	1	1	3	0.00000	0.000000	0.00000000
3	3	1	2	3	0.00000	6.666667	0.77066667
3	3	1	3	3	0.00000	33.333333	1.44400000
3	3	2	1	3	0.00000	0.000000	0.00000000
3	3	2	2	3	0.00000	23.333333	0.87866667
3	3	2	3	3	7.66667	33.333333	2.12066667
3	4	1	1	3	0.00000	0.000000	0.00000000
3	4	1	2	3	0.00000	3.333333	0.47233333
3	4	1	3	3	0.33333	27.266667	1.96933333
3	4	2	1	3	0.00000	0.000000	0.00000000
3	4	2	2	3	0.00000	0.533333	0.44566667
3	4	2	3	3	423.33333	60.000000	1.97166667
3	5	1	1	3	0.00000	0.000000	0.00000000
3	5	1	2	3	0.00000	0.000000	0.00000000
3	5	1	3	3	773.33333	70.000000	1.88666667
3	5	2	1	3	0.00000	0.000000	0.00000000
3	5	2	2	3	0.00000	3.566667	0.68633333
3	5	2	3	3	28.66667	10.366667	1.86866667
4	1	1	1	3	0.00000	0.000000	0.00000000
4	1	1	2	3	0.00000	0.000000	0.00000000
4	1	1	3	3	1166.66667	33.333333	1.98966667
4	1	2	1	3	0.00000	0.000000	0.00000000
4	1	2	2	3	0.00000	0.733333	0.42533333
4	1	2	3	3	0.00000	6.200000	1.89600000
4	2	1	1	3	0.00000	0.000000	0.00000000
4	2	1	2	3	0.00000	0.000000	0.00000000
4	2	1	3	3	700.00000	6.333333	1.99366667
4	2	2	1	3	0.00000	0.000000	0.00000000
4	2	2	2	3	0.00000	0.433333	0.26766667
4	2	2	3	3	0.00000	0.000000	0.00000000
4	3	1	1	3	0.00000	0.000000	0.00000000
4	3	1	2	3	0.00000	0.000000	0.00000000
4	3	1	3	3	666.66667	26.666667	0.57233333
4	3	2	1	3	0.00000	0.000000	0.00000000
4	3	2	2	3	0.00000	4.733333	0.64533333
4	3	2	3	3	0.00000	41.033333	1.33166667

STATISTICAL ANALYSIS SYSTEM
YR=77 DAY=305

MEANS

SPECIES	FERT	PROP	ZONE	N	STEM_DEN	CRAB_B	ELEV
4	4	1	1	3	0.00000	0.0000000	0.00000000
4	4	1	2	3	0.00000	0.4333333	0.51700000
4	4	1	3	3	2900.00000	80.0000000	1.79433333
4	4	2	1	3	0.00000	0.0000000	0.00000000
4	4	2	2	3	0.00000	23.3333333	0.97766667
4	4	2	3	3	0.00000	33.3333333	1.26833333
4	5	1	1	3	0.00000	0.0000000	0.00000000
4	5	1	2	3	0.00000	0.4333333	0.30433333
4	5	1	3	3	556.66667	65.5333333	1.99733333
4	5	2	1	3	0.00000	0.0000000	0.00000000
4	5	2	2	3	0.00000	0.0000000	0.00000000
4	5	2	3	3	0.00000	4.6666667	1.18933333
5	1	1	1	3	456.66667	0.0000000	0.28500000
5	1	1	2	3	103.33333	33.3333333	1.38133333
5	1	1	3	3	6.66667	16.6666667	1.32500000
5	1	2	1	3	0.00000	0.0000000	0.00000000
5	1	2	2	3	130.00000	7.3333333	0.72400000
5	1	2	3	3	0.00000	23.7666667	2.10600000
5	2	1	1	3	323.33333	0.0000000	0.29100000
5	2	1	2	3	433.33333	3.8666667	0.72033333
5	2	1	3	3	10.00000	20.0000000	1.27000000
5	2	2	1	3	0.00000	0.0000000	0.00000000
5	2	2	2	3	83.33333	3.3333333	0.82466667
5	2	2	3	3	130.33333	13.3333333	1.86666667
5	3	1	1	3	0.33333	0.0000000	0.00000000
5	3	1	2	3	436.66667	0.5333333	0.61766667
5	3	1	3	3	0.33333	3.3333333	1.35166667
5	3	2	1	3	0.00000	0.0000000	0.00000000
5	3	2	2	3	266.66667	1.2666667	0.80666667
5	3	2	3	3	0.00000	0.6000000	0.73200000
5	4	1	1	3	0.00000	0.0000000	0.00000000
5	4	1	2	3	113.33333	10.0666667	0.91533333
5	4	1	3	3	90.00000	43.3333333	1.19633333
5	4	2	1	3	0.00000	0.0000000	0.00000000
5	4	2	2	3	10.00000	3.6333333	0.91466667
5	4	2	3	3	69.00000	27.0000000	1.87466667
5	5	1	1	3	0.00000	0.0000000	0.00000000
5	5	1	2	3	180.00000	16.6666667	0.95700000
5	5	1	3	3	30.33333	50.0000000	1.30200000
5	5	2	1	3	0.00000	0.0000000	0.00000000
5	5	2	2	3	52.00000	6.8666667	0.93133333
5	5	2	3	3	16.66667	23.3333333	1.34266667
6	1	1	1	3	0.00000	0.0000000	0.00000000
6	1	1	2	3	0.00000	0.0000000	0.00000000
6	1	1	3	3	36.00000	26.6666667	2.17933333
6	1	2	1	3	0.00000	0.0000000	0.00000000
6	1	2	2	3	50.00000	6.6666667	0.83100000
6	1	2	3	3	16.33333	23.3333333	2.19000000
6	2	1	1	3	0.00000	0.0000000	0.00000000
6	2	1	2	3	0.00000	0.0666667	0.47400000
6	2	1	3	3	53.33333	6.6666667	1.29433333
6	2	2	1	3	0.00000	0.0000000	0.00000000
6	2	2	2	3	0.00000	36.6666667	0.79066667
6	2	2	3	3	46.66667	16.6666667	1.80566667

C198

STATISTICAL ANALYSIS SYSTEM
YR=77 DAY=105

MEANS

SPECIES	FERT	PROP	ZONE	N	STEM_DEN	CRAB_B	ELEV
6	3	1	1	3	0.00000	0.0000000	0.00000000
6	3	1	2	3	0.00000	1.5666667	0.47433333
6	3	1	3	3	56.66667	13.3333333	1.30133333
6	3	2	1	3	0.00000	0.0000000	0.00000000
6	3	2	2	3	0.00000	1.0333333	0.47866667
6	3	2	3	3	40.00000	33.3333333	1.85233333
6	4	1	1	3	0.00000	0.0000000	0.00000000
6	4	1	2	3	0.00000	0.0000000	0.00000000
6	4	1	3	3	450.00000	16.6666667	1.14433333
6	4	2	1	3	0.00000	0.0000000	0.00000000
6	4	2	2	3	0.00000	0.7333333	0.41766667
6	4	2	3	3	0.33333	34.4333333	1.84333333
6	5	1	1	3	0.00000	0.0000000	0.00000000
6	5	1	2	3	0.00000	3.3333333	0.28366667
6	5	1	3	3	90.00000	1.5666667	1.18600000
6	5	2	1	3	0.00000	0.0000000	0.00000000
6	5	2	2	3	30.00000	0.6666667	0.78266667
6	5	2	3	3	0.66667	5.3333333	1.78833333
7	1	1	1	3	0.00000	0.0000000	0.00000000
7	1	1	2	3	0.00000	0.8000000	0.30933333
7	1	1	3	3	866.66667	16.6666667	1.19766667
7	1	2	1	3	0.00000	0.0000000	0.00000000
7	1	2	2	3	0.00000	0.0000000	0.00000000
7	1	2	3	3	1153.33333	60.0000000	1.45333333
7	2	1	1	3	0.00000	0.0000000	0.00000000
7	2	1	2	3	0.00000	0.2666667	0.29533333
7	2	1	3	3	1833.33333	36.6666667	1.71233333
7	2	2	1	3	0.00000	0.0000000	0.00000000
7	2	2	2	3	0.00000	0.2333333	0.52566667
7	2	2	3	3	3333.33333	20.0000000	1.15366667
7	3	1	1	3	0.00000	0.0000000	0.00000000
7	3	1	2	3	0.00000	0.0000000	0.00000000
7	3	1	3	3	1466.66667	20.8666667	1.99633333
7	3	2	1	3	0.00000	0.0000000	0.00000000
7	3	2	2	3	0.00000	3.8666667	0.92500000
7	3	2	3	3	2973.33333	43.3333333	1.51500000
7	4	1	1	3	0.00000	0.0000000	0.00000000
7	4	1	2	3	0.00000	0.0000000	0.00000000
7	4	1	3	3	4533.33333	66.6666667	2.06466667
7	4	2	1	3	0.00000	0.0000000	0.00000000
7	4	2	2	3	0.00000	3.3333333	0.36333333
7	4	2	3	3	1516.66667	3.5666667	1.75033333
7	5	1	1	3	0.00000	0.0000000	0.00000000
7	5	1	2	3	0.00000	0.0000000	0.00000000
7	5	1	3	3	1266.66667	40.0000000	1.94300000
7	5	2	1	3	0.00000	0.0000000	0.00000000
7	5	2	2	3	0.00000	0.0000000	0.00000000
7	5	2	3	3	0.00000	3.8666667	1.14633333
8	1	1	1	3	0.00000	0.0000000	0.00000000
8	1	1	2	3	83.33333	0.0000000	0.28700000
8	1	1	3	3	0.00000	18.1000000	2.18466667
8	1	2	1	3	0.00000	0.0000000	0.00000000
8	1	2	2	3	0.00000	4.4333333	1.15333333
8	1	2	3	3	0.00000	0.8666667	1.34900000

C199

STATISTICAL ANALYSIS SYSTEM
YR=77 DAY=305

MEANS

SPECIES	FERT	PROP	ZONE	N	STEM_DEN	CRAB_B	ELEV
8	2	1	1	3	0.00000	0.0000000	0.00000000
8	2	1	2	3	0.00000	0.1333333	0.22333333
8	2	1	3	3	0.00000	17.4333333	1.36066667
8	2	2	1	3	0.00000	0.0000000	0.00000000
8	2	2	2	3	146.66667	13.3333333	1.12966667
8	2	2	3	3	0.00000	30.0000000	1.79300000
8	3	1	1	3	0.00000	0.0000000	0.00000000
8	3	1	2	3	0.00000	16.6666667	0.83466667
8	3	1	3	3	0.00000	1.2666667	2.01266667
8	3	2	1	3	0.00000	0.0000000	0.00000000
8	3	2	2	3	0.00000	0.0000000	0.00000000
8	3	2	3	3	0.00000	6.6666667	1.27466667
8	4	1	1	3	0.00000	0.0000000	0.00000000
8	4	1	2	3	0.00000	3.8666667	0.79866667
8	4	1	3	3	0.00000	10.3333333	1.35366667
8	4	2	1	3	0.00000	0.0000000	0.00000000
8	4	2	2	3	0.00000	33.3333333	0.99133333
8	4	2	3	3	2.33333	10.2666667	1.66466667
8	5	1	1	3	0.00000	0.0000000	0.00000000
8	5	1	2	3	0.00000	0.5333333	0.47166667
8	5	1	3	3	0.00000	6.6666667	1.27333333
8	5	2	1	3	0.00000	0.0000000	0.00000000
8	5	2	2	3	256.66667	0.9333333	0.99600000
8	5	2	3	3	0.00000	7.1666667	1.26433333

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M
YR=77 DAY=305

ANALYSIS OF VARIANCE FOR VARIABLE STEM_DEN   MEAN   162.359722   C.V.   414.843766 %

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	LSD .01	LSD .05	DIVISOR
REP	2	4858149	2429074.5			
ZONE	2	29344076	14672038.2			
ERROR A	4	7599430	1899857.5	579.314209	349.343506	240
SPECIES	7	27238643	3891234.6			
FERT	4	1804913	451228.3			
SPECIES*FERT	28	10191699	363989.2			
PROP	1	1287697	1287696.7			
SPECIES*PROP	7	2735471	390781.6			
FERT*PROP	4	2340300	585074.9			
SPECIES*FERT*PROP	28	8459793	302135.5			
SPECIES*ZONE	14	61655765	4403983.2			
FERT*ZONE	8	4312751	539093.9			
SPECIES*FERT*ZONE	56	19818978	353910.3			
PROP*ZONE	2	1806586	903293.1			
SPECIES*PROP*ZONE	14	5998776	428484.0			
FERT*PROP*ZONE	8	5475529	684441.1			
SPECIES*FERT*PROP*ZONE	56	16296114	291002.0			
ERROR B	474	215029376	453648.5			
RESIDUAL	474	215029376	453648.5			
CORRECTED TOTAL	719	426254046	592842.9			

C201

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M
YR=77 DAY=305

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB > F
NUMERATOR:	ZONE	2	29344076	14672038.2	7.72270	0.0437
DENOMINATOR:	ERROR A	4	7599430	1899857.5		
NUMERATOR:	SPECIES	7	27238643	3891234.8	8.57764	0.0001
DENOMINATOR:	ERROR B	474	215029376	453648.5		
NUMERATOR:	FERT	4	1804913	451228.3	0.99467	0.5890
DENOMINATOR:	ERROR B	474	215029376	453648.5		
NUMERATOR:	SPECIES*FERT	28	10191699	363989.2	0.80236	0.7558
DENOMINATOR:	ERROR B	474	215029376	453648.5		
NUMERATOR:	PROP	1	1287697	1287696.7	2.83853	0.0887
DENOMINATOR:	ERROR B	474	215029376	453648.5		
NUMERATOR:	SPECIES*PROP	7	2735471	390781.6	0.86142	0.5380
DENOMINATOR:	ERROR B	474	215029376	453648.5		
NUMERATOR:	FERT*PROP	4	2340300	585074.9	1.28971	0.2721
DENOMINATOR:	ERROR B	474	215029376	453648.5		
NUMERATOR:	SPECIES*FERT*PROP	28	8459793	302135.5	0.66601	0.9046
DENOMINATOR:	ERROR B	474	215029376	453648.5		
NUMERATOR:	SPECIES*ZONE	14	61655765	4403983.2	9.70792	0.0001
DENOMINATOR:	ERROR B	474	215029376	453648.5		
NUMERATOR:	FERT*ZONE	8	4312751	539093.9	1.18835	0.3034
DENOMINATOR:	ERROR B	474	215029376	453648.5		

C202

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M
YR=77 DAY=305

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB > F
NUMERATOR:	SPECIES*FERT*ZONE	56	19818978	353910.3	0.78014	0.8744
DENOMINATOR:	ERROR B	474	215029376	453648.5		
NUMERATOR:	PROP*ZONE	2	1806586	903293.1	1.99117	0.1354
DENOMINATOR:	ERROR B	474	215029376	453648.5		
NUMERATOR:	SPECIES*PROP*ZONE	14	5998776	428484.0	0.94453	0.5106
DENOMINATOR:	ERROR B	474	215029376	453648.5		
NUMERATOR:	FERT*PROP*ZONE	8	5475529	684441.1	1.50875	0.1509
DENOMINATOR:	ERROR B	474	215029376	453648.5		
NUMERATOR:	SPECIES*FERT*PROP*ZONE	56	16296114	291002.0	0.64147	0.9795
DENOMINATOR:	ERROR B	474	215029376	453648.5		

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M
YR=77 DAY=305

ANALYSIS OF VARIANCE FOR VARIABLE CRAB_6 MEAN 10.9938889 C.V. 204.805967 %

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	LSD .01	LSD .05	DIVISOR
REP	2	4976.163	2488.0816			
ZONE	2	111784.624	55892.3121			
ERROR A	4	6479.891	1619.9726	16.9163666	10.2010794	240
SPECIES	7	16956.517	2422.3596			
FERT	4	3348.786	837.1966			
SPECIES*FERT	28	12176.800	434.8857			
PROP	1	72.835	72.8347			
SPECIES*PROP	7	5822.810	831.8301			
FERT*PROP	4	4594.385	1148.5962			
SPECIES*FERT*PROP	28	8189.893	292.4962			
SPECIES*ZONE	14	42512.960	3036.6400			
FERT*ZONE	8	8249.409	1031.1761			
SPECIES*FERT*ZONE	56	20793.734	371.3167			
PROP*ZONE	2	2195.426	1097.7128			
SPECIES*PROP*ZONE	14	12551.259	896.5185			
FERT*PROP*ZONE	8	7271.336	908.9170			
SPECIES*FERT*PROP*ZONE	56	21681.386	387.1676			
ERROR B	474	240306.899	506.9766			
RESIDUAL	474	240306.899	506.9766			
CORRECTED TOTAL	719	529965.113	737.0864			

C204

C205

STATISTICAL ANALYSIS SYSTEM
YR=77 DAY=305

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB > F
NUMERATOR:	ZONE	2	111784.624	55892.3121	34.50201	0.0047
DENOMINATOR:	ERROR A	4	6479.891	1619.9728		
NUMERATOR:	SPECIES	7	16956.517	2422.3596	4.77805	0.0001
DENOMINATOR:	ERROR B	474	240306.899	506.9766		
NUMERATOR:	FERT	4	3348.786	837.1966	1.65135	0.1590
DENOMINATOR:	ERROR B	474	240306.899	506.9766		
NUMERATOR:	SPECIES*FERT	28	12176.800	434.8857	0.85780	0.6786
DENOMINATOR:	ERROR B	474	240306.899	506.9766		
NUMERATOR:	PROP	1	72.835	72.8347	0.14366	0.7066
DENOMINATOR:	ERROR B	474	240306.899	506.9766		
NUMERATOR:	SPECIES*PROP	7	5822.810	831.8301	1.64077	0.1211
DENOMINATOR:	ERROR B	474	240306.899	506.9766		
NUMERATOR:	FERT*PROP	4	4594.385	1148.5962	2.26558	0.0603
DENOMINATOR:	ERROR B	474	240306.899	506.9766		
NUMERATOR:	SPECIES*FERT*PROP	28	8189.893	292.4962	0.57694	0.9610
DENOMINATOR:	ERROR B	474	240306.899	506.9766		
NUMERATOR:	SPECIES*ZONE	14	42512.960	3036.6400	5.98970	0.0001
DENOMINATOR:	ERROR B	474	240306.899	506.9766		
NUMERATOR:	FERT*ZONE	8	8249.409	1031.1761	2.03397	0.0406
DENOMINATOR:	ERROR B	474	240306.899	506.9766		

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M
YR=77 DAY=305

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB > F
NUMERATOR:	SPECIES*FERT*ZONE	56	20793.734	371.3167	0.73241	0.9253
DENOMINATOR:	ERROR B	474	240306.899	506.9766		
NUMERATOR:	PROP*ZONE	2	2195.426	1097.7128	2.16521	0.1136
DENOMINATOR:	ERROR B	474	240306.899	506.9766		
NUMERATOR:	SPECIES*PROP*ZONE	14	12551.259	896.5185	1.76836	0.0402
DENOMINATOR:	ERROR B	474	240306.899	506.9766		
NUMERATOR:	FERT*PROP*ZONE	8	7271.336	908.9170	1.79282	0.0757
DENOMINATOR:	ERROR B	474	240306.899	506.9766		
NUMERATOR:	SPECIES*FERT*PROP*ZONE	56	21681.386	387.1676	0.76368	0.8938
DENOMINATOR:	ERROR B	474	240306.899	506.9766		

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M
YR=77 DAY=305

ANALYSIS OF VARIANCE FOR VARIABLE ELEV   MEAN 0.689034722   C.V. 74.9532717 %

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	LSD .01	LSD .05	DIVISOR
REP	2	17.957842	8.978921			
ZONE	2	330.945420	165.472710			
ERROR A	4	9.771317	2.442829	0.656901300	0.396130979	240
SPECIES	7	2.620020	0.374289			
FERT	4	1.437538	0.359485			
SPECIES*FERT	28	9.867226	0.352401			
PROP	1	0.505037	0.505037			
SPECIES*PROP	7	2.336584	0.336655			
FERT*PROP	4	0.461894	0.115474			
SPECIES*FERT*PROP	28	10.013482	0.357624			
SPECIES*ZONE	14	11.308307	0.807736			
FERT*ZONE	8	4.137651	0.517206			
SPECIES*FERT*ZONE	56	12.001539	0.214313			
PROP*ZONE	2	2.057130	1.028565			
SPECIES*PROP*ZONE	14	6.522288	0.465878			
FERT*PROP*ZONE	8	1.429174	0.178647			
SPECIES*FERT*PROP*ZONE	56	17.425347	0.311167			
ERROR B	474	126.427557	0.266725			
RESIDUAL	474	126.427557	0.266725			
CORRECTED TOTAL	719	567.245754	0.788937			

C207

STATISTICAL ANALYSIS SYSTEM
YR=77 DAY=305

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB > F
NUMERATOR:	ZONE	2	330.945420	165.472710	67.73814	0.0020
DENOMINATOR:	ERROR A	4	9.771317	2.442829		
NUMERATOR:	SPECIES	7	2.620020	0.374289	1.40328	0.2010
DENOMINATOR:	ERROR B	474	126.427557	0.266725		
NUMERATOR:	FERT	4	1.437938	0.359485	1.34777	0.2501
DENOMINATOR:	ERROR B	474	126.427557	0.266725		
NUMERATOR:	SPECIES*FERT	28	9.867226	0.352401	1.32122	0.1282
DENOMINATOR:	ERROR B	474	126.427557	0.266725		
NUMERATOR:	PROP	1	0.505037	0.505037	1.89348	0.1658
DENOMINATOR:	ERROR B	474	126.427557	0.266725		
NUMERATOR:	SPECIES*PROP	7	2.356584	0.336655	1.26218	0.2665
DENOMINATOR:	ERROR B	474	126.427557	0.266725		
NUMERATOR:	FERT*PROP	4	0.461894	0.115474	0.43293	0.7872
DENOMINATOR:	ERROR B	474	126.427557	0.266725		
NUMERATOR:	SPECIES*FERT*PROP	28	10.013482	0.357624	1.34080	0.1165
DENOMINATOR:	ERROR B	474	126.427557	0.266725		
NUMERATOR:	SPECIES*ZONE	14	11.308307	0.807736	3.02835	0.0003
DENOMINATOR:	ERROR B	474	126.427557	0.266725		
NUMERATOR:	FERT*ZONE	8	4.137651	0.517206	1.93910	0.0520
DENOMINATOR:	ERROR B	474	126.427557	0.266725		

STATISTICAL ANALYSIS SYSTEM

YR=77 DAY=305

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB > F
NUMERATOR:	SPECIES*FERT*ZONE	56	12.011539	0.214313	0.80350	0.8435
DENOMINATOR:	ERROR B	474	126.427557	0.266725		
NUMERATOR:	PROP*ZONE	2	2.057130	1.028565	3.85628	0.0213
DENOMINATOR:	ERROR B	474	126.427557	0.266725		
NUMERATOR:	SPECIES*PROP*ZONE	14	6.522288	0.465878	1.74666	0.0437
DENOMINATOR:	ERROR B	474	126.427557	0.266725		
NUMERATOR:	FERT*PROP*ZONE	8	1.429174	0.178647	0.66978	0.7201
DENOMINATOR:	ERROR B	474	126.427557	0.266725		
NUMERATOR:	SPECIES*FERT*PROP*ZONE	56	17.425347	0.311167	1.16662	0.2009
DENOMINATOR:	ERROR B	474	126.427557	0.266725		

C209

STATISTICAL ANALYSIS SYSTEM
DAY=305

DATA SET PASS

CLASSES	VALUES
SPECIES	1 2 3 4 5 6 7 8
FERT	1 2 3 4 5
PROP	1 2
REP	1 2 3
ZONE	1 2 3

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M
DAY=305

MEANS

SPECIES	FERT	PROP	ZONE	N	RT_BIO	AIR_P	RS
1	1	1	1	3	0.00000	0.000000	0.0000000
1	1	1	2	3	0.00000	0.000000	0.0000000
1	1	1	3	3	515.66667	163.000000	3.9038217
1	1	2	1	3	0.00000	0.000000	0.0000000
1	1	2	2	3	0.00000	0.000000	0.0000000
1	1	2	3	3	71.33333	139.666667	0.4984359
1	2	1	1	3	0.00000	0.000000	0.0000000
1	2	1	2	3	0.00000	0.000000	0.0000000
1	2	1	3	3	183.00000	193.000000	0.5383722
1	2	2	1	3	0.00000	0.000000	0.0000000
1	2	2	2	3	0.00000	0.000000	0.0000000
1	2	2	3	3	355.33333	196.666667	1.6167920
1	3	1	1	3	0.00000	0.000000	0.0000000
1	3	1	2	3	0.00000	0.000000	0.0000000
1	3	1	3	3	1059.66667	481.000000	1.6056510
1	3	2	1	3	0.00000	0.000000	0.0000000
1	3	2	2	3	0.00000	0.000000	0.0000000
1	3	2	3	3	176.33333	227.000000	0.3706981
1	4	1	1	3	0.00000	0.000000	0.0000000
1	4	1	2	3	0.00000	0.000000	0.0000000
1	4	1	3	3	120.66667	205.666667	0.4049663
1	4	2	1	3	0.00000	0.000000	0.0000000
1	4	2	2	3	0.00000	0.000000	0.0000000
1	4	2	3	3	233.66667	433.666667	0.4024227
1	5	1	1	3	0.00000	0.000000	0.0000000
1	5	1	2	3	0.00000	0.000000	0.0000000
1	5	1	3	3	246.66667	377.000000	0.4171793
1	5	2	1	3	0.00000	0.000000	0.0000000
1	5	2	2	3	0.00000	0.000000	0.0000000
1	5	2	3	3	3.33333	23.333333	0.0476190
2	1	1	1	3	0.00000	0.000000	0.0000000
2	1	1	2	3	0.00000	0.000000	0.0000000
2	1	1	3	3	129.33333	120.000000	2.3583333
2	1	2	1	3	0.00000	0.000000	0.0000000
2	1	2	2	3	0.00000	0.000000	0.0000000
2	1	2	3	3	212.00000	199.666667	1.0256065
2	2	1	1	3	0.00000	0.000000	0.0000000
2	2	1	2	3	0.00000	0.000000	0.0000000
2	2	1	3	3	311.66667	486.666667	0.8290868
2	2	2	1	3	0.00000	0.000000	0.0000000
2	2	2	2	3	0.00000	0.000000	0.0000000
2	2	2	3	3	118.33333	203.333333	0.3388889
2	3	1	1	3	0.00000	0.000000	0.0000000
2	3	1	2	3	0.06667	0.033333	0.6666667
2	3	1	3	3	72.66667	17.666667	1.3710692
2	3	2	1	3	0.00000	0.000000	0.0000000
2	3	2	2	3	0.00000	0.000000	0.0000000
2	3	2	3	3	71.33333	73.333333	0.5518519
2	4	1	1	3	0.00000	0.000000	0.0000000
2	4	1	2	3	12.33333	26.666667	0.4238495
2	4	1	3	3	646.66667	490.000000	2.4251208
2	4	2	1	3	0.00000	0.000000	0.0000000
2	4	2	2	3	0.00000	0.000000	0.0000000

2	4	2	3	3	91.66667	99.333333	0.6223197

STATISTICAL ANALYSIS SYSTEM

DAY=305

MEANS

SPECIES	FERT	PROP	ZONE	N	RT_BIO	AIR_B	KS
2	5	1	1	3	0.00000	0.00000	0.0000000
2	5	1	2	3	0.00000	0.00000	0.0000000
2	5	1	3	3	387.33333	228.00000	10.3185185
2	5	2	1	3	0.00000	0.00000	0.0000000
2	5	2	2	3	0.00000	0.00000	0.0000000
2	5	2	3	3	204.00000	170.00000	1.4101010
3	1	1	1	3	0.00000	0.00000	0.0000000
3	1	1	2	3	0.00000	0.00000	0.0000000
3	1	1	3	3	34.33333	54.00000	0.2119342
3	1	2	1	3	0.00000	0.00000	0.0000000
3	1	2	2	3	0.00000	0.00000	0.0000000
3	1	2	3	3	479.00000	106.66667	3.8852889
3	2	1	1	3	0.00000	0.00000	0.0000000
3	2	1	2	3	0.00000	0.00000	0.0000000
3	2	1	3	3	0.00000	0.00000	0.0000000
3	2	2	1	3	0.00000	0.00000	0.0000000
3	2	2	2	3	0.00000	0.00000	0.0000000
3	2	2	3	3	0.00000	0.00000	0.0000000
3	3	1	1	3	0.00000	0.00000	0.0000000
3	3	1	2	3	0.00000	0.00000	0.0000000
3	3	1	3	3	0.00000	0.00000	0.0000000
3	3	2	1	3	0.00000	0.00000	0.0000000
3	3	2	2	3	0.00000	0.00000	0.0000000
3	3	2	3	3	188.00000	141.33333	1.6475345
3	4	1	1	3	0.00000	0.00000	0.0000000
3	4	1	2	3	0.00000	17.33333	0.0000000
3	4	1	3	3	22.00000	22.00000	0.3333333
3	4	2	1	3	0.00000	0.00000	0.0000000
3	4	2	2	3	0.00000	0.00000	0.0000000
3	4	2	3	3	1351.33333	888.66667	1.3752705
3	5	1	1	3	0.00000	0.00000	0.0000000
3	5	1	2	3	0.00000	0.00000	0.0000000
3	5	1	3	3	1282.00000	288.33333	2.6861968
3	5	2	1	3	0.00000	0.00000	0.0000000
3	5	2	2	3	0.00000	0.00000	0.0000000
3	5	2	3	3	467.66667	1668.66667	0.1986666
4	1	1	1	3	0.00000	0.00000	0.0000000
4	1	1	2	3	0.00000	0.00000	0.0000000
4	1	1	3	3	1264.66667	500.00000	0.8222222
4	1	2	1	3	0.00000	0.00000	0.0000000
4	1	2	2	3	0.00000	0.00000	0.0000000
4	1	2	3	3	0.00000	0.00000	0.0000000
4	2	1	1	3	0.00000	0.00000	0.0000000
4	2	1	2	3	0.00000	0.00000	0.0000000
4	2	1	3	3	281.66667	450.00000	1.1362439
4	2	2	1	3	0.00000	0.00000	0.0000000
4	2	2	2	3	0.00000	106.66667	0.0000000
4	2	2	3	3	0.00000	0.00000	0.0000000
4	3	1	1	3	0.00000	0.00000	0.0000000
4	3	1	2	3	0.00000	0.00000	0.0000000
4	3	1	3	3	296.66667	226.66667	0.1196237
4	3	2	1	3	0.00000	0.00000	0.0000000
4	3	2	2	3	0.00000	0.00000	0.0000000

4	3	2	3	3	0.00000	0.00000	0.0000000

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

DAY=505

MEANS

SPECIES	FERT	PROP	ZONE	N	RT_W10	AIR_H	WS
4	4	1	1	3	0.00000	0.00000	0.00000000
4	4	1	2	3	0.00000	0.00000	0.00000000
4	4	1	3	3	800.00000	1923.33333	0.27576306
4	4	2	1	3	0.00000	0.00000	0.00000000
4	4	2	2	3	0.00000	0.00000	0.00000000
4	4	2	3	3	0.00000	0.00000	0.00000000
4	5	1	1	3	0.00000	0.00000	0.00000000
4	5	1	2	3	0.00000	0.00000	0.00000000
4	5	1	3	3	1443.00000	1482.66667	0.80712826
4	5	2	1	3	0.00000	0.00000	0.00000000
4	5	2	2	3	0.00000	0.00000	0.00000000
4	5	2	3	3	0.00000	0.00000	0.00000000
5	1	1	1	3	531.66667	257.66667	0.62779646
5	1	1	2	3	104.66667	240.00000	0.45509168
5	1	1	3	3	25.33333	5.00000	1.68888889
5	1	2	1	3	0.00000	0.00000	0.00000000
5	1	2	2	3	117.00000	199.33333	0.45923913
5	1	2	3	3	0.00000	0.00000	0.00000000
5	2	1	1	3	426.66667	1190.66667	0.11944756
5	2	1	2	3	114.00000	89.33333	1.01911135
5	2	1	3	3	28.66667	9.66667	0.98850575
5	2	2	1	3	0.00000	0.00000	0.00000000
5	2	2	2	3	100.00000	150.33333	0.48631090
5	2	2	3	3	235.16667	41.66667	4.90873016
5	3	1	1	3	0.00000	0.00000	0.00000000
5	3	1	2	3	289.00000	456.33333	0.89808680
5	3	1	3	3	0.06667	2.00000	0.01111111
5	3	2	1	3	0.00000	0.00000	0.00000000
5	3	2	2	3	207.66667	178.00000	0.79929057
5	3	2	3	3	0.00000	0.00000	0.00000000
5	4	1	1	3	0.00000	0.00000	0.00000000
5	4	1	2	3	158.33333	272.33333	0.77472394
5	4	1	3	3	105.00000	109.33333	0.78239766
5	4	2	1	3	0.00000	0.00000	0.00000000
5	4	2	2	3	6.66667	0.33333	6.66666667
5	4	2	3	3	1116.33333	784.66667	1.08500054
5	5	1	1	3	450.00000	325.66667	0.92440784
5	5	1	2	3	52.00000	412.00000	0.09352518
5	5	1	3	3	133.66667	122.33333	1.31186359
5	5	2	1	3	0.00000	0.00000	0.00000000
5	5	2	2	3	308.00000	278.33333	0.86861916
5	5	2	3	3	58.33333	5.66667	3.45137255
6	1	1	1	3	0.00000	0.00000	0.00000000
6	1	1	2	3	0.00000	0.00000	0.00000000
6	1	1	3	3	410.66667	108.00000	2.71153846
6	1	2	1	3	0.00000	0.00000	0.00000000
6	1	2	2	3	150.00000	170.00000	0.29411765
6	1	2	3	3	536.66667	310.00000	1.15726179
6	2	1	1	3	0.00000	0.00000	0.00000000
6	2	1	2	3	0.00000	0.00000	0.00000000
6	2	1	3	3	459.33333	595.66667	1.40322880
6	2	2	1	3	0.00000	0.00000	0.00000000
6	2	2	2	3	0.00000	0.00000	0.00000000

6	2	2	3	3	163.33333	60.00000	1.64069264

STATISTICAL ANALYSIS SYSTEM
DAY=305

MEANS

SPECIES	FERT	PROP	ZONE	N	RT_BIO	AIR_B	RS
6	3	1	1	3	0.00000	0.00000	0.0000000
6	3	1	2	3	0.00000	0.00000	0.0000000
6	3	1	3	3	504.66667	355.66667	2.1886623
6	3	2	1	3	0.00000	0.00000	0.0000000
6	3	2	2	3	0.00000	0.00000	0.0000000
6	3	2	3	3	302.33333	148.66667	1.9160726
6	4	1	1	3	0.00000	0.00000	0.0000000
6	4	1	2	3	0.00000	0.00000	0.0000000
6	4	1	3	3	116.00000	211.33333	0.5094283
6	4	2	1	3	0.00000	0.00000	0.0000000
6	4	2	2	3	0.00000	0.00000	0.0000000
6	4	2	3	3	114.66667	78.00000	1.0626984
6	5	1	1	3	0.00000	0.00000	0.0000000
6	5	1	2	3	0.00000	0.00000	0.0000000
6	5	1	3	3	285.66667	411.33333	0.8626958
6	5	2	1	3	0.00000	0.00000	0.0000000
6	5	2	2	3	45.33333	31.00000	0.4874552
6	5	2	3	3	106.33333	127.00000	19.8947368
7	1	1	1	3	0.00000	0.00000	0.0000000
7	1	1	2	3	0.00000	0.00000	0.0000000
7	1	1	3	3	0.00000	0.00000	0.0000000
7	1	2	1	3	0.00000	0.00000	0.0000000
7	1	2	2	3	0.00000	0.00000	0.0000000
7	1	2	3	3	1930.00000	2159.00000	0.5144658
7	2	1	1	3	0.00000	0.00000	0.0000000
7	2	1	2	3	0.00000	0.00000	0.0000000
7	2	1	3	3	327.00000	833.33333	0.1053333
7	2	2	1	3	0.00000	0.00000	0.0000000
7	2	2	2	3	0.00000	0.00000	0.0000000
7	2	2	3	3	33.33333	333.33333	0.0333333
7	3	1	1	3	0.00000	0.00000	0.0000000
7	3	1	2	3	0.00000	0.00000	0.0000000
7	3	1	3	3	1796.66667	1932.33333	0.9969435
7	3	2	1	3	0.00000	0.00000	0.0000000
7	3	2	2	3	0.00000	0.00000	0.0000000
7	3	2	3	3	1092.33333	2622.33333	0.4196412
7	4	1	1	3	0.00000	0.00000	0.0000000
7	4	1	2	3	0.00000	0.00000	0.0000000
7	4	1	3	3	2763.33333	948.33333	3.1514855
7	4	2	1	3	0.00000	0.00000	0.0000000
7	4	2	2	3	0.00000	0.00000	0.0000000
7	4	2	3	3	2169.66667	755.33333	1.4587021
7	5	1	1	3	0.00000	0.00000	0.0000000
7	5	1	2	3	0.00000	0.00000	0.0000000
7	5	1	3	3	980.00000	873.33333	0.6698024
7	5	2	1	3	0.00000	0.00000	0.0000000
7	5	2	2	3	0.00000	0.00000	0.0000000
7	5	2	3	3	0.00000	0.00000	0.0000000
8	1	1	1	3	0.00000	0.00000	0.0000000
8	1	1	2	3	0.00000	0.00000	0.0000000
8	1	1	3	3	0.00000	0.00000	0.0000000
8	1	2	1	3	0.00000	0.00000	0.0000000
8	1	2	2	3	0.00000	0.00000	0.0000000

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8	1	2	3	3	0.00000	0.00000	0.0000000

STATISTICAL ANALYSIS SYSTEM
DAY=305

MEANS

SPECIES	FERT	PROP	ZONE	N	RT_BIO	AIR_H	RS
8	2	1	1	3	0.000000	0.000000	0.00000000
8	2	1	2	3	0.000000	0.000000	0.00000000
8	2	1	3	3	0.000000	0.000000	0.00000000
8	2	2	1	3	0.000000	0.000000	0.00000000
8	2	2	2	3	0.000000	0.000000	0.00000000
8	2	2	3	3	0.000000	0.000000	0.00000000
8	3	1	1	3	0.000000	0.000000	0.00000000
8	3	1	2	3	0.000000	0.000000	0.00000000
8	3	1	3	3	0.000000	0.000000	0.00000000
8	3	2	1	3	0.000000	0.000000	0.00000000
8	3	2	2	3	0.000000	0.000000	0.00000000
8	3	2	3	3	0.000000	0.000000	0.00000000
8	4	1	1	3	0.000000	0.000000	0.00000000
8	4	1	2	3	0.000000	0.000000	0.00000000
8	4	1	3	3	0.000000	0.000000	0.00000000
8	4	2	1	3	0.000000	0.000000	0.00000000
8	4	2	2	3	0.000000	0.000000	0.00000000
8	4	2	3	3	0.000000	0.000000	0.00000000
8	5	1	1	3	0.000000	0.000000	0.00000000
8	5	1	2	3	0.000000	0.000000	0.00000000
8	5	1	3	3	0.000000	0.000000	0.00000000
8	5	2	1	3	0.000000	0.000000	0.00000000
8	5	2	2	3	0.000000	0.000000	0.00000000
8	5	2	3	3	0.000000	0.000000	0.00000000

STATISTICAL ANALYSIS SYSTEM

DAY=505

MEANS

FERT	PROP	ZONE	N	RT_BIO	AIR_B	RS
1	1	1	24	66.458333	32.20833	0.08597456
1	1	2	24	13.083333	30.00000	0.05688646
1	1	3	24	297.500000	118.75000	1.46209235
1	2	1	24	0.000000	0.00000	0.00000000
1	2	2	24	33.375000	46.16667	0.09416960
1	2	3	24	403.625000	364.37500	0.88513233
2	1	1	24	53.333333	148.83333	0.01493094
2	1	2	24	14.250000	11.16667	0.12738892
2	1	3	24	198.916667	321.04167	0.62509635
2	2	1	24	0.000000	0.00000	0.00000000
2	2	2	24	12.500000	32.12500	0.06078886
2	2	3	24	113.187500	104.37500	1.06730463
3	1	1	24	0.000000	0.00000	0.00000000
3	1	2	24	36.133333	57.04583	0.19559418
3	1	3	24	466.300000	451.91667	0.81163257
3	2	1	24	0.000000	0.00000	0.00000000
3	2	2	24	25.958333	22.25000	0.09991132
3	2	3	24	228.791667	401.58333	0.61324978
4	1	1	24	0.000000	0.00000	0.00000000
4	1	2	24	21.333333	39.54167	0.14982168
4	1	3	24	571.708333	488.75000	0.98531187
4	2	1	24	0.000000	0.00000	0.00000000
4	2	2	24	0.833333	0.04167	0.83333333
4	2	3	24	634.666667	379.95833	0.75130425
5	1	1	24	56.250000	40.45833	0.11555098
5	1	2	24	6.500000	51.50000	0.01169065
5	1	3	24	594.791667	472.87500	2.13417333
5	2	1	24	0.000000	0.00000	0.00000000
5	2	2	24	44.166667	38.66667	0.16950929
5	2	3	24	104.958333	249.33333	3.12281200

STATISTICAL ANALYSIS SYSTEM
DAY=305

MEANS

SPECIES	PROP	ZONE	N	RT_BIO	AIP_B	RS
1	1	1	15	0.00000	0.00000	0.00000000
1	1	2	15	0.00000	0.00000	0.00000000
1	1	3	15	425.13333	283.93333	1.41399811
1	2	1	15	0.00000	0.00000	0.00000000
1	2	2	15	0.00000	0.00000	0.00000000
1	2	3	15	168.00000	204.06667	0.58719355
2	1	1	15	0.00000	0.00000	0.00000000
2	1	2	15	2.48000	5.34000	0.21810323
2	1	3	15	309.53333	268.46667	3.46042572
2	2	1	15	0.00000	0.00000	0.00000000
2	2	2	15	0.00000	0.00000	0.00000000
2	2	3	15	139.46667	149.13333	0.76975355
3	1	1	15	0.00000	0.00000	0.00000000
3	1	2	15	0.00000	3.46667	0.00000000
3	1	3	15	267.66667	72.86667	0.64629325
3	2	1	15	0.00000	0.00000	0.00000000
3	2	2	15	0.00000	0.00000	0.00000000
3	2	3	15	497.20000	561.06667	1.42215610
4	1	1	15	0.00000	0.00000	0.00000000
4	1	2	15	0.00000	0.00000	0.00000000
4	1	3	15	817.20000	1036.53333	0.63219621
4	2	1	15	0.00000	0.00000	0.00000000
4	2	2	15	0.00000	21.33333	0.00000000
4	2	3	15	0.00000	0.00000	0.00000000
5	1	1	15	281.66667	354.40000	0.34633037
5	1	2	15	143.60000	294.00000	0.64810779
5	1	3	15	58.54667	49.66667	0.95655340
5	2	1	15	0.00000	0.00000	0.00000000
5	2	2	15	147.86667	161.26667	1.85602529
5	2	3	15	281.96667	166.40000	1.88502065
6	1	1	15	0.00000	0.00000	0.00000000
6	1	2	15	0.00000	0.00000	0.00000000
6	1	3	15	355.26667	336.40000	1.55511074
6	2	1	15	0.00000	0.00000	0.00000000
6	2	2	15	39.06667	40.20000	0.15631457
6	2	3	15	244.66667	144.73333	5.13429245
7	1	1	15	0.00000	0.00000	0.00000000
7	1	2	15	0.00000	0.00000	0.00000000
7	1	3	15	1173.40000	917.46667	0.98471291
7	2	1	15	0.00000	0.00000	0.00000000
7	2	2	15	0.00000	0.00000	0.00000000
7	2	3	15	1045.06667	1174.00000	0.48526847
8	1	1	15	0.00000	0.00000	0.00000000
8	1	2	15	0.00000	0.00000	0.00000000
8	1	3	15	0.00000	0.00000	0.00000000
8	2	1	15	0.00000	0.00000	0.00000000
8	2	2	15	0.00000	0.00000	0.00000000
8	2	3	15	0.00000	0.00000	0.00000000

STATISTICAL ANALYSIS SYSTEM

DAY=305

MEANS

PROP	ZONE	N	RT_BIO	AIR_B	RS
1	1	120	35.208333	44.300000	0.04329130
1	2	120	18.260000	37.850833	0.10827638
1	3	120	425.843333	370.666667	1.20366129
2	1	120	0.000000	0.000000	0.00000000
2	2	120	23.366667	27.850000	0.25154248
2	3	120	297.045833	299.925000	1.28796060

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STATISTICAL ANALYSIS SYSTEM
DAY=305

MEANS

SPECIES	FERT	ZONE	N	RT_BIO	AIR_B	RS
1	1	1	6	0.000000	0.000000	0.00000000
1	1	2	6	0.000000	0.000000	0.00000000
1	1	3	6	293.500000	151.333333	2.20112880
1	2	1	6	0.000000	0.000000	0.00000000
1	2	2	6	0.000000	0.000000	0.00000000
1	2	3	6	269.166667	194.833333	1.07759211
1	3	1	6	0.000000	0.000000	0.00000000
1	3	2	6	0.000000	0.000000	0.00000000
1	3	3	6	618.000000	354.000000	1.08817456
1	4	1	6	0.000000	0.000000	0.00000000
1	4	2	6	0.000000	0.000000	0.00000000
1	4	3	6	177.166667	319.666667	0.40369452
1	5	1	6	0.000000	0.000000	0.00000000
1	5	2	6	0.000000	0.000000	0.00000000
1	5	3	6	125.000000	200.166667	0.23239917
2	1	1	6	0.000000	0.000000	0.00000000
2	1	2	6	0.000000	0.000000	0.00000000
2	1	3	6	170.666667	159.833333	1.69196982
2	2	1	6	0.000000	0.000000	0.00000000
2	2	2	6	0.000000	0.000000	0.00000000
2	2	3	6	215.000000	345.000000	0.58398783
2	3	1	6	0.000000	0.000000	0.00000000
2	3	2	6	0.033333	0.016667	0.33333333
2	3	3	6	72.000000	45.500000	0.96146052
2	4	1	6	0.000000	0.000000	0.00000000
2	4	2	6	6.166667	13.333333	0.21192474
2	4	3	6	369.166667	294.666667	1.52372023
2	5	1	6	0.000000	0.000000	0.00000000
2	5	2	6	0.000000	0.000000	0.00000000
2	5	3	6	295.666667	199.000000	5.86430976
3	1	1	6	0.000000	0.000000	0.00000000
3	1	2	6	0.000000	0.000000	0.00000000
3	1	3	6	256.666667	89.333333	2.04861151
3	2	1	6	0.000000	0.000000	0.00000000
3	2	2	6	0.000000	0.000000	0.00000000
3	2	3	6	0.000000	0.000000	0.00000000
3	3	1	6	0.000000	0.000000	0.00000000
3	3	2	6	0.000000	0.000000	0.00000000
3	3	3	6	94.000000	70.666667	0.82376726
3	4	1	6	0.000000	0.000000	0.00000000
3	4	2	6	0.000000	8.666667	0.00000000
3	4	3	6	686.666667	455.333333	0.85631193
3	5	1	6	0.000000	0.000000	0.00000000
3	5	2	6	0.000000	0.000000	0.00000000
3	5	3	6	874.833333	978.500000	1.44243268
4	1	1	6	0.000000	0.000000	0.00000000
4	1	2	6	0.000000	0.000000	0.00000000
4	1	3	6	632.333333	250.000000	0.41111111
4	2	1	6	0.000000	0.000000	0.00000000
4	2	2	6	0.000000	53.333333	0.00000000
4	2	3	6	140.833333	225.000000	0.56812194
4	3	1	6	0.000000	0.000000	0.00000000
4	3	2	6	0.000000	0.000000	0.00000000

4	3	3	6	148.333333	413.333333	0.05981183

STATISTICAL ANALYSIS SYSTEM

DAY=305

MEANS

SPECIES	FERT	ZONE	N	RT_BIO	AIR_B	RS
4	4	1	6	0.00000	0.00000	0.0000000
4	4	2	6	0.00000	0.00000	0.0000000
4	4	3	6	400.00000	961.66667	0.1378815
4	5	1	6	0.00000	0.00000	0.0000000
4	5	2	6	0.00000	0.00000	0.0000000
4	5	3	6	721.50000	741.33333	0.4035641
5	1	1	6	265.83333	128.83333	0.3436982
5	1	2	6	110.83333	219.66667	0.4571654
5	1	3	6	12.66667	2.50000	0.8444444
5	2	1	6	213.33333	595.33333	0.0597238
5	2	2	6	107.00000	119.83333	0.7527111
5	2	3	6	131.91667	25.66667	2.9486180
5	3	1	6	0.00000	0.00000	0.0000000
5	3	2	6	248.33333	317.16667	0.8486887
5	3	3	6	0.03333	1.00000	0.0055556
5	4	1	6	0.00000	0.00000	0.0000000
5	4	2	6	82.50000	136.33333	3.7206953
5	4	3	6	610.66667	447.00000	0.9336991
5	5	1	6	225.00000	161.83333	0.4622039
5	5	2	6	180.00000	345.16667	0.4810722
5	5	3	6	96.00000	64.00000	2.3716181
6	1	1	6	0.00000	0.00000	0.0000000
6	1	2	6	75.00000	85.00000	0.1470588
6	1	3	6	473.66667	209.00000	1.9344001
6	2	1	6	0.00000	0.00000	0.0000000
6	2	2	6	0.00000	0.00000	0.0000000
6	2	3	6	311.33333	327.83333	1.5219607
6	3	1	6	0.00000	0.00000	0.0000000
6	3	2	6	0.00000	0.00000	0.0000000
6	3	3	6	405.50000	252.16667	2.0523674
6	4	1	6	0.00000	0.00000	0.0000000
6	4	2	6	0.00000	0.00000	0.0000000
6	4	3	6	115.33333	144.66667	0.7860634
6	5	1	6	0.00000	0.00000	0.0000000
6	5	2	6	22.66667	15.50000	0.2437276
6	5	3	6	196.00000	269.16667	10.3787163
7	1	1	6	0.00000	0.00000	0.0000000
7	1	2	6	0.00000	0.00000	0.0000000
7	1	3	6	965.00000	1079.50000	0.2572329
7	2	1	6	0.00000	0.00000	0.0000000
7	2	2	6	0.00000	0.00000	0.0000000
7	2	3	6	180.16667	583.33333	0.0693333
7	3	1	6	0.00900	0.00000	0.0000000
7	3	2	6	0.00000	0.00000	0.0000000
7	3	3	6	1444.50000	2277.33333	0.7063922
7	4	1	6	0.00000	0.00000	0.0000000
7	4	2	6	0.00000	0.00000	0.0000000
7	4	3	6	2466.50000	851.83333	2.3050938
7	5	1	6	0.00000	0.00000	0.0000000
7	5	2	6	0.00000	0.00000	0.0000000
7	5	3	6	490.00000	436.66667	0.3349012
8	1	1	6	0.00000	0.00000	0.0000000
8	1	2	6	0.00000	0.00000	0.0000000

8	1	3	6	0.00000	0.00000	0.0000000

STATISTICAL ANALYSIS SYSTEM
DAY=305

MEANS

SPECIES	FERT	ZONE	N	RT_BIO	AIR_B	RS
8	2	1	6	0.00000	0.00000	0.00000000
8	2	2	6	0.00000	0.00000	0.00000000
8	2	3	6	0.00000	0.00000	0.00000000
8	3	1	6	0.00000	0.00000	0.00000000
8	3	2	6	0.00000	0.00000	0.00000000
8	3	3	6	0.00000	0.00000	0.00000000
8	4	1	6	0.00000	0.00000	0.00000000
8	4	2	6	0.00000	0.00000	0.00000000
8	4	3	6	0.00000	0.00000	0.00000000
8	5	1	6	0.00000	0.00000	0.00000000
8	5	2	6	0.00000	0.00000	0.00000000
8	5	3	6	0.00000	0.00000	0.00000000

FERT	ZONE	N	RT_BIO	AIR_B	RS
1	1	48	33.22917	16.10417	0.04298728
1	2	48	23.22917	36.08333	0.07552803
1	3	48	350.56250	241.56250	1.17361234
2	1	48	26.66667	74.41667	0.00746547
2	2	48	13.37500	21.64583	0.09408889
2	3	48	156.05208	212.70833	0.84620049
3	1	48	0.00000	0.00000	0.00000000
3	2	48	31.04583	39.64792	0.14775275
3	3	48	347.54583	426.75000	0.71244117
4	1	48	0.00000	0.00000	0.00000000
4	2	48	11.08333	19.79167	0.49157751
4	3	48	603.18750	434.35417	0.86830806
5	1	48	28.12500	20.22917	0.05777549
5	2	48	25.33333	45.08333	0.09059597
5	3	48	349.87500	361.10417	2.62849267

C221

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

DAY=305

MEANS

SPECIES	ZONE	N	RT_BIO	AIR_B	RS
1	1	30	0.00000	0.00000	0.00000000
1	2	30	0.00000	0.00000	0.00000000
1	3	30	296.56667	244.00000	1.00059583
2	1	30	0.00000	0.00000	0.00000000
2	2	30	1.24000	2.67000	0.10905161
2	3	30	224.50000	208.80000	2.12508963
3	1	30	0.00000	0.00000	0.00000000
3	2	30	0.00000	1.73333	0.00000000
3	3	30	382.43333	316.96667	1.03422468
4	1	30	0.00000	0.00000	0.00000000
4	2	30	0.00000	10.66667	0.00000000
4	3	30	408.60000	518.26667	0.31609811
5	1	30	140.83333	177.20000	0.17316519
5	2	30	145.73333	227.63333	1.25206654
5	3	30	170.25667	108.03333	1.42078702
6	1	30	0.00000	0.00000	0.00000000
6	2	30	19.53333	20.10000	0.07815728
6	3	30	299.96667	240.56667	3.33470159
7	1	30	0.00000	0.00000	0.00000000
7	2	30	0.00000	0.00000	0.00000000
7	3	30	1109.23333	1045.73333	0.73499069
8	1	30	0.00000	0.00000	0.00000000
8	2	30	0.00000	0.00000	0.00000000
8	3	30	0.00000	0.00000	0.00000000

ZONE	N	RT_BIO	AIR_B	RS
1	240	17.60417	22.15000	0.02164565
2	240	20.81333	32.85042	0.17990943
3	240	361.44458	335.29583	1.24581094

C222

STATISTICAL ANALYSIS SYSTEM
DAY=305

MEANS

SPECIES	FERT	PROP	N	RT_BIO	AIR_B	RS
1	1	1	9	171.888889	54.333333	1.30127591
1	1	2	9	23.777778	46.555556	0.16614529
1	2	1	9	61.000000	64.333333	0.17945742
1	2	2	9	118.444444	65.555556	0.53893066
1	3	1	9	353.222222	160.333333	0.60188366
1	3	2	9	58.777778	75.666667	0.12356604
1	4	1	9	40.222222	68.555556	0.15498877
1	4	2	9	77.888889	144.555556	0.13414091
1	5	1	9	82.222222	125.666667	0.13905976
1	5	2	9	1.111111	7.777778	0.01587302
2	1	1	9	43.111111	40.000000	0.78611111
2	1	2	9	70.666667	66.555556	0.34186877
2	2	1	9	103.888889	162.222222	0.27636226
2	2	2	9	39.444444	67.777778	0.11296296
2	3	1	9	24.244444	5.900000	0.67924528
2	3	2	9	23.777778	24.444444	0.18395062
2	4	1	9	219.666667	172.222222	0.94965675
2	4	2	9	30.555556	33.111111	0.20743990
2	5	1	9	129.111111	76.000000	3.43950617
2	5	2	9	68.000000	56.666667	0.47003367
3	1	1	9	11.444444	18.000000	0.07064472
3	1	2	9	159.666667	35.555556	1.29509629
3	2	1	9	0.000000	0.000000	0.00000000
3	2	2	9	0.000000	0.000000	0.00000000
3	3	1	9	0.000000	0.000000	0.00000000
3	3	2	9	62.666667	47.111111	0.54917817
3	4	1	9	7.333333	13.111111	0.11111111
3	4	2	9	450.444444	296.222222	0.45976351
3	5	1	9	477.333333	96.111111	0.89539959
3	5	2	9	155.888889	556.222222	0.06622219
4	1	1	9	421.555556	166.666667	0.27407407
4	1	2	9	0.000000	0.000000	0.00000000
4	2	1	9	93.888889	150.000000	0.37874796
4	2	2	9	0.000000	35.555556	0.00000000
4	3	1	9	98.888889	275.555556	0.03987455
4	3	2	9	0.000000	0.000000	0.00000000
4	4	1	9	266.666667	661.111111	0.09192102
4	4	2	9	0.000000	0.000000	0.00000000
4	5	1	9	481.000000	494.222222	0.26904275
4	5	2	9	0.000000	0.000000	0.00000000
5	1	1	9	220.555556	167.555556	0.94392568
5	1	2	9	39.000000	66.444444	0.15307971
5	2	1	9	189.777778	429.888889	0.70902155
5	2	2	9	111.722222	64.000000	1.79834702
5	3	1	9	96.355556	152.777778	0.30396597
5	3	2	9	69.222222	59.333333	0.26643019
5	4	1	9	87.777778	127.222222	0.51904053
5	4	2	9	374.333333	261.666667	2.58388907
5	5	1	9	211.888889	286.000000	0.77659887
5	5	2	9	122.111111	94.666667	1.43333057
6	1	1	9	136.888889	36.000000	0.90384615
6	1	2	9	222.888889	160.000000	0.48379315
6	2	1	9	153.111111	198.555556	0.46774293

6	2	2	9	54.444444	20.000000	0.54689755

STATISTICAL ANALYSIS SYSTEM

DAY=305

MEANS

SPECIES	FERT	PROP	N	RT_BIO	AIR_B	RS
6	3	1	9	168.222222	118.555556	0.72955409
6	3	2	9	100.777778	49.555556	0.63869085
6	4	1	9	38.666667	70.444444	0.16980945
6	4	2	9	38.222222	26.000000	0.35423260
6	5	1	9	95.222222	137.111111	0.28756527
6	5	2	9	50.555556	52.666667	6.79406401
7	1	1	9	0.000000	0.000000	0.00000000
7	1	2	9	643.333333	719.666667	0.17146859
7	2	1	9	109.000000	277.777778	0.03511111
7	2	2	9	11.111111	111.111111	0.01111111
7	3	1	9	598.888889	644.111111	0.33231444
7	3	2	9	364.111111	874.111111	0.13994705
7	4	1	9	921.111111	316.111111	1.05049517
7	4	2	9	723.222222	251.777778	0.48623402
7	5	1	9	326.666667	291.111111	0.22326747
7	5	2	9	0.000000	0.000000	0.00000000
8	1	1	9	0.000000	0.000000	0.00000000
8	1	2	9	0.000000	0.000000	0.00000000
8	2	1	9	0.000000	0.000000	0.00000000
8	2	2	9	0.000000	0.000000	0.00000000
8	3	1	9	0.000000	0.000000	0.00000000
8	3	2	9	0.000000	0.000000	0.00000000
8	4	1	9	0.000000	0.000000	0.00000000
8	4	2	9	0.000000	0.000000	0.00000000
8	5	1	9	0.000000	0.000000	0.00000000
8	5	2	9	0.000000	0.000000	0.00000000

FERT	PROP					
1	1		72	125.680556	60.319444	0.53498446
1	2		72	145.666667	136.847222	0.32643397
2	1		72	88.833333	160.347222	0.25580540
2	2		72	41.895833	45.500000	0.37603116
3	1		72	167.477778	169.654167	0.33574225
3	2		72	84.916667	141.277778	0.23772037
4	1		72	197.680556	176.097222	0.37837785
4	2		72	211.833333	126.666667	0.52621253
5	1		72	219.180556	188.277778	0.75380499
5	2		72	49.708333	96.000000	1.09744043

STATISTICAL ANALYSIS SYSTEM

DAY=305

MEANS

SPECIES	PROP	N	RT_FIO	AIR_3	RS
1	1	45	141.711111	94.644444	0.47133270
1	2	45	56.000000	68.022222	0.19573118
2	1	45	104.004444	91.268889	1.22617631
2	2	45	46.488889	49.711111	0.26325118
3	1	45	89.222222	25.444444	0.21543108
3	2	45	165.733333	187.022222	0.47405203
4	1	45	272.400000	345.511111	0.21073207
4	2	45	0.000000	7.111111	0.00000000
5	1	45	161.271111	232.688889	0.65033052
5	2	45	143.277778	109.222222	1.24701531
6	1	45	118.422222	112.133333	0.51170358
6	2	45	94.577778	61.644444	1.76353567
7	1	45	391.133333	305.822222	0.32823764
7	2	45	348.355556	391.333333	0.16175616
8	1	45	0.000000	0.000000	0.00000000
8	2	45	0.000000	0.000000	0.00000000

PROP	N	RT_FIO	AIR_3	RS
1	360	159.770556	150.939167	0.45174299
2	360	106.804167	109.258333	0.51316769

STATISTICAL ANALYSIS SYSTEM

DAY=305

MEANS

SPECIES	FERT	N	RT_BIO	AIR_B	RS
1	1	18	97.833333	50.444444	0.73370960
1	2	18	89.722222	64.944444	0.35919404
1	3	18	206.000000	118.000000	0.36272485
1	4	18	59.055556	106.555556	0.13456484
1	5	18	41.666667	66.722222	0.07746639
2	1	18	56.888889	53.277778	0.56398994
2	2	18	71.666667	115.000000	0.19466261
2	3	18	24.011111	15.172222	0.43159795
2	4	18	125.111111	102.666667	0.57854832
2	5	18	98.555556	66.333333	1.95476992
3	1	18	85.555556	26.777778	0.68287050
3	2	18	0.000000	0.000000	0.00000000
3	3	18	31.333333	23.555556	0.27458909
3	4	18	228.888889	154.666667	0.28543731
3	5	18	291.611111	326.166667	0.48081089
4	1	18	210.777778	83.333333	0.13703704
4	2	18	46.944444	92.777778	0.18937398
4	3	18	49.444444	137.777778	0.01993728
4	4	18	133.333333	320.555556	0.04596051
4	5	18	240.500000	247.111111	0.13452138
5	1	18	129.777778	117.000000	0.54850269
5	2	18	150.750000	246.944444	1.25368429
5	3	18	82.788889	106.055556	0.28474608
5	4	18	231.055556	194.444444	1.55146480
5	5	18	167.000000	190.333333	1.10496472
6	1	18	182.888889	98.000000	0.69381965
6	2	18	103.777778	109.277778	0.50732024
6	3	18	134.500000	84.055556	0.68412747
6	4	18	38.444444	48.222222	0.26202113
6	5	18	72.888889	94.888889	3.54081464
7	1	18	321.666667	359.833333	0.08574430
7	2	18	60.055556	194.444444	0.02311111
7	3	18	481.500000	759.111111	0.23613075
7	4	18	827.166667	283.944444	0.76836459
7	5	18	163.333333	145.555556	0.11163373
8	1	18	0.000000	0.000000	0.00000000
8	2	18	0.000000	0.000000	0.00000000
8	3	18	0.000000	0.000000	0.00000000
8	4	18	0.000000	0.000000	0.00000000
8	5	18	0.000000	0.000000	0.00000000

FERT	N	RT_BIO	AIR_B	RS
1	144	135.673611	98.583333	0.43070922
2	144	65.364583	102.923611	0.31591828
3	144	126.197222	155.465972	0.28673131
4	144	204.756944	151.381944	0.45329519
5	144	134.444444	142.138889	0.92562271

C225

STATISTICAL ANALYSIS SYSTEM

DAY=305

MEANS

SPECIES	N	RT_010	AIR_9	RS
1	90	98.855556	81.333333	0.33353194
2	90	75.246667	70.490000	0.74471375
3	90	127.477778	106.233333	0.34474156
4	90	136.200000	176.311111	0.10536604
5	90	152.274444	170.955556	0.94867292
6	90	106.500000	86.888889	1.13761963
7	90	369.744444	348.577778	0.24499690
8	90	0.000000	0.000000	0.00000000
OVERALL MEANS	720	133.287361	130.098750	0.48245534

G227

STATISTICAL ANALYSIS SYSTEM
DAY=305

ANALYSIS OF VARIANCE FOR VARIABLE RT_RIO   MEAN 133.287361   C.V. 368.510401 %

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	LSD .01	LSD .05	DIVISOR
REP	2	1029835	514917.51			
ZONE	2	18741294	9370647.17			
ERROR A	4	1423462	355865.55	250.724380	151.194244	240
SPECIES	7	7141685	1020240.66			
FERT	4	1408134	352033.49			
SPECIES*FERT	28	7609657	271773.47			
PROP	1	504979	504978.90			
SPECIES*PROP	7	1597250	228178.58			
FERT*PROP	4	875263	218815.69			
SPECIES*FERT*PROP	28	4844428	173015.30			
SPECIES*ZONE	14	16597321	1185522.93			
FERT*ZONE	8	3507494	438436.71			
SPECIES*FERT*ZONE	56	15799194	282128.47			
PROP*ZONE	2	566291	283145.57			
SPECIES*PROP*ZONE	14	4644329	331737.80			
FERT*PROP*ZONE	8	2033930	254241.28			
SPECIES*FERT*PROP*ZONE	56	9343615	166850.27			
ERROR B	474	114355164	241255.62			
LSD_SPECIES	474	114355164	241255.62	189.363907	143.878906	90
LSD_FERT	474	114355164	241255.62	149.705307	113.746246	144
LSD_SP*F	474	114355164	241255.62	423.430420	321.722900	18
LSD_SP*Z	474	114355164	241255.62	327.987793	249.205566	30
LSD_SP*P	474	114355164	241255.62	267.800781	203.475494	45
LSD_SP*P*Z	474	114355164	241255.62	463.844971	352.429688	15
RESIDUAL	474	114355164	241255.62			
CORRECTED TOTAL	719	212023326	294885.41			

C228

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M
DAY=305

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB > F
NUMERATOR:	ZONE	2	18741294	9370647.17	26.33199	0.0068
DENOMINATOR:	ERROR A	4	1423462	355865.55		
NUMERATOR:	SPECIES	7	7141685	1020240.66	4.22888	0.0003
DENOMINATOR:	ERROR B	474	114355164	241255.62		
NUMERATOR:	FERT	4	1408134	352033.49	1.45917	0.2123
DENOMINATOR:	ERROR B	474	114355164	241255.62		
NUMERATOR:	SPECIES*FERT	28	7609657	271773.47	1.12650	0.3007
DENOMINATOR:	ERROR B	474	114355164	241255.62		
NUMERATOR:	PROP	1	504979	504978.90	2.09313	0.1447
DENOMINATOR:	ERROR B	474	114355164	241255.62		
NUMERATOR:	SPECIES*PROP	7	1597250	228178.58	0.94580	0.5284
DENOMINATOR:	ERROR B	474	114355164	241255.62		
NUMERATOR:	FERT*PROP	4	875263	218815.69	0.90699	0.5386
DENOMINATOR:	ERROR B	474	114355164	241255.62		
NUMERATOR:	SPECIES*FERT*PROP	28	4844428	173015.30	0.71715	0.8571
DENOMINATOR:	ERROR B	474	114355164	241255.62		
NUMERATOR:	SPECIES*ZONE	14	16597321	1185522.93	4.91397	0.0001
DENOMINATOR:	ERROR B	474	114355164	241255.62		
NUMERATOR:	FERT*ZONE	8	3507494	438436.71	1.81731	0.0712
DENOMINATOR:	ERROR B	474	114355164	241255.62		

C229

STATISTICAL ANALYSIS SYSTEM

DAY=305

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB > F
NUMERATOR:	SPECIES*FERT*ZONE	56	15799194	282128.47	1.16942	0.1974
DENOMINATOR:	ERROR B	474	114355164	241255.62		
NUMERATOR:	PROP*ZONE	2	566291	283145.57	1.17363	0.3100
DENOMINATOR:	ERROR B	474	114355164	241255.62		
NUMERATOR:	SPECIES*PROP*ZONE	14	4644329	331737.80	1.37505	0.1606
DENOMINATOR:	ERROR B	474	114355164	241255.62		
NUMERATOR:	FERT*PROP*ZONE	8	2033930	254241.28	1.05385	0.3946
DENOMINATOR:	ERROR B	474	114355164	241255.62		
NUMERATOR:	SPECIES*FERT*PROP*ZONE	56	9343615	166850.27	0.69159	0.9559
DENOMINATOR:	ERROR B	474	114355164	241255.62		

C230

STATISTICAL ANALYSIS SYSTEM
DAY=305

ANALYSIS OF VARIANCE FOR VARIABLE AIR_H   MEAN 130.098750   C.V. 343.708364 %

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	LSD .01	LSD .05	DIVISOR
REP	2	855474	427737.14			
ZONE	2	15171843	7585921.68			
ERROR A	4	804567	201141.83	188.497147	113.669373	240
SPECIES	7	6914840	987834.22			
FERT	4	428133	107033.22			
SPECIES*FERT	28	6442787	230099.52			
PROP	1	312713	312712.54			
SPECIES*PROP	7	3470956	495850.79			
FERT*PROP	4	796454	199113.42			
SPECIES*FERT*PROP	28	4776220	170579.30			
SPECIES*ZONE	14	17298266	1235590.44			
FERT*ZONE	8	1824446	228055.71			
SPECIES*FERT*ZONE	56	13926986	248696.17			
PROP*ZONE	2	111301	55650.43			
SPECIES*PROP*ZONE	14	8066489	576177.77			
FERT*PROP*ZONE	8	1180468	147558.55			
SPECIES*FERT*PROP*ZONE	56	9985643	178315.05			
ERROR B	474	94777400	199952.32			
LSD_SPECIES	474	94777400	199952.32	172.393799	130.985001	90
LSD_FERT	474	94777400	199952.32	136.289261	103.552734	144
LSD_SP*F	474	94777400	199952.32	385.484131	292.891357	18
LSD_SP*Z	474	94777400	199952.32	298.594727	226.872711	30
LSD_SP*P	474	94777400	199952.32	243.801682	185.240768	45
LSD_SP*P*Z	474	94777400	199952.32	422.276855	320.846436	15
RESIDUAL	474	94777400	199952.32			
CORRECTED TOTAL	719	187144984	260285.10			

C231

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M
DAY=305

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB > F
NUMERATOR:	ZONE	2	15171843	7585921.68	37.71429	0.0041
DENOMINATOR:	ERROR A	4	804567	201141.83		
NUMERATOR:	SPECIES	7	6914840	987834.22	4.94035	0.0001
DENOMINATOR:	ERROR B	474	94777400	199952.32		
NUMERATOR:	FERT	4	428133	107033.22	0.53529	0.7132
DENOMINATOR:	ERROR B	474	94777400	199952.32		
NUMERATOR:	SPECIES*FERT	28	6442787	230099.52	1.15077	0.2733
DENOMINATOR:	ERROR B	474	94777400	199952.32		
NUMERATOR:	PROP	1	312713	312712.54	1.56394	0.2090
DENOMINATOR:	ERROR B	474	94777400	199952.32		
NUMERATOR:	SPECIES*PROP	7	3470956	495850.79	2.47985	0.0165
DENOMINATOR:	ERROR B	474	94777400	199952.32		
NUMERATOR:	FERT*PROP	4	796454	199113.42	0.99580	0.5896
DENOMINATOR:	ERROR B	474	94777400	199952.32		
NUMERATOR:	SPECIES*FERT*PROP	28	4776220	170579.30	0.85310	0.6854
DENOMINATOR:	ERROR B	474	94777400	199952.32		
NUMERATOR:	SPECIES*ZONE	14	17298266	1235590.44	6.17943	0.0001
DENOMINATOR:	ERROR B	474	94777400	199952.32		
NUMERATOR:	FERT*ZONE	8	1824446	228055.71	1.14055	0.3339
DENOMINATOR:	ERROR B	474	94777400	199952.32		

C232

STATISTICAL ANALYSIS SYSTEM

DAY=305

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB > F
NUMERATOR:	SPECIES*FERT*ZONE	56	13926986	248696.17	1.24378	0.1203
DENOMINATOR:	ERROR B	474	94777400	199952.32		
NUMERATOR:	PROP*ZONE	2	111301	55650.43	0.27832	0.7612
DENOMINATOR:	ERROR B	474	94777400	199952.32		
NUMERATOR:	SPECIES*PROP*ZONE	14	8066489	576177.77	2.88158	0.0005
DENOMINATOR:	ERROR B	474	94777400	199952.32		
NUMERATOR:	FERT*PROP*ZONE	8	1180468	147558.55	0.73797	0.6597
DENOMINATOR:	ERROR B	474	94777400	199952.32		
NUMERATOR:	SPECIES*FERT*PROP*ZONE	56	9985643	178315.05	0.89179	0.6957
DENOMINATOR:	ERROR B	474	94777400	199952.32		

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

DAY=305

ANALYSIS OF VARIANCE FOR VARIABLE RS   MEAN 0.482455341   C.V. 554.493464 %

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	LSD .01	LSD .05	DIVISOR
REP	2	19.86785	9.933925			
ZONE	2	212.78193	106.390965			
ERROR A	4	37.57491	9.393727	1.28816795	0.776803672	240
SPECIES	7	106.90810	15.272586			
FERT	4	38.29936	9.574840			
SPECIES*FERT	28	164.41343	5.871908			
PROP	1	0.67914	0.679139			
SPECIES*PROP	7	68.29025	9.755750			
FERT*PROP	4	6.81216	1.703039			
SPECIES*FERT*PROP	28	211.83020	7.565364			
SPECIES*ZONE	14	172.16478	12.297484			
FERT*ZONE	8	87.98905	10.998631			
SPECIES*FERT*ZONE	56	329.44729	5.882987			
PROP*ZONE	2	1.09120	0.545601			
SPECIES*PROP*ZONE	14	113.94702	8.139073			
FERT*PROP*ZONE	8	16.95344	2.119180			
SPECIES*FERT*PROP*ZONE	56	414.61223	7.403790			
ERROR B	474	3392.23118	7.156606			
LSD_SPECIES	474	3392.23118	7.156606	1.03136349	0.783631563	90
LSD_FERT	474	3392.23118	7.156606	0.815364957	0.619515121	144
LSD_SP*F	474	3392.23118	7.156606	2.30620003	1.75225353	18
LSD_SP*Z	474	3392.23118	7.156606	1.78637505	1.35728931	30
LSD_SP*P	474	3392.23118	7.156606	1.45856857	1.10822201	45
LSD_SP*P*Z	474	3392.23118	7.156606	2.52631569	1.91949749	15
RESIDUAL	474	3392.23118	7.156606			
CORRECTED TOTAL	719	5395.89351	7.504720			

C234

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M
DAY=305

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB > F
NUMERATOR:	ZONE	2	212.78193	106.390965	11.32575	0.0242
DENOMINATOR:	ERROR A	4	37.57491	9.393727		
NUMERATOR:	SPECIES	7	106.90810	15.272586	2.13405	0.0384
DENOMINATOR:	ERROR B	474	3392.23118	7.156606		
NUMERATOR:	FERT	4	38.29936	9.574840	1.33790	0.2537
DENOMINATOR:	ERROR B	474	3392.23118	7.156606		
NUMERATOR:	SPECIES*FERT	28	164.41343	5.871908	0.82049	0.7314
DENOMINATOR:	ERROR B	474	3392.23118	7.156606		
NUMERATOR:	PROP	1	0.67914	0.679139	0.09490	0.7564
DENOMINATOR:	ERROR B	474	3392.23118	7.156606		
NUMERATOR:	SPECIES*PROP	7	68.29025	9.755750	1.36318	0.2181
DENOMINATOR:	ERROR B	474	3392.23118	7.156606		
NUMERATOR:	FERT*PROP	4	6.81216	1.703039	0.23797	0.9157
DENOMINATOR:	ERROR B	474	3392.23118	7.156606		
NUMERATOR:	SPECIES*FERT*PROP	28	211.83020	7.565364	1.05712	0.3878
DENOMINATOR:	ERROR B	474	3392.23118	7.156606		
NUMERATOR:	SPECIES*ZONE	14	172.16478	12.297484	1.71834	0.0486
DENOMINATOR:	ERROR B	474	3392.23118	7.156606		
NUMERATOR:	FERT*ZONE	8	87.98905	10.998631	1.53685	0.1413
DENOMINATOR:	ERROR B	474	3392.23118	7.156606		

C235

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

DAY=305

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB > F
NUMERATOR:	SPECIES*FERT*ZONE	56	329.44729	5.882987	0.82204	0.8164
DENOMINATOR:	ERROR B	474	3392.23118	7.156606		
NUMERATOR:	PROP*ZONE	2	1.09120	0.545601	0.07624	0.9261
DENOMINATOR:	ERROR B	474	3392.23118	7.156606		
NUMERATOR:	SPECIES*PROP*ZONE	14	113.94702	8.139073	1.13728	0.3216
DENOMINATOR:	ERROR B	474	3392.23118	7.156606		
NUMERATOR:	FERT*PROP*ZONE	8	16.95344	2.119180	0.29612	0.9665
DENOMINATOR:	ERROR B	474	3392.23118	7.156606		
NUMERATOR:	SPECIES*FERT*PROP*ZONE	56	414.61223	7.403790	1.03454	0.4118
DENOMINATOR:	ERROR B	474	3392.23118	7.156606		

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TRD-78-26
App A

APPENDIX D

GRAPHIC REPRESENTATION OF BUTTERMILK SOUND DEPENDENT VARIABLES

Parts 1-4

Legend for Dependent Variable Codes

stem_den	=	Stems /m^2.
Crab_b	=	Crab burrows /m^2.
Elev	=	Elevation (m) above mean low water.
Air_b	=	Aerial biomass gdw/m^2.
Rt_bio	=	Root biomass gdw/m^2.
Cond	=	Condition index.
Basal_ar	=	Basal area cm^2/m^2.
Shoot_Ht	=	Average Shoot Height cm.
Fl_Stm	=	Flowering stems /m^2.
Survival	=	Percent survival of original sprigs.

Legend for Class Variable Codes

Species

1	=	*Borrichia frutescens*
2	=	*Distichlis spicata*
3	=	*Iva frutescens*
4	=	*Juncus roemerianus*
5	=	*Spartina alterniflora*
6	=	*Spartina cynosuroides*
7	=	*Spartina patens*
8	=	No plant (control)

Zone

1 = Lower third of intertidal zone.

2 = Middle third of intertidal zone.

3 = Upper third of intertidal zone.

Fert = Fertilizer treatment

1 = No fertilizer.

2 = Inorganic 122 g/m^2.

3 = Inorganic 244 g/m^2.

4 = Organic 34 g/m^2.

5 = Organic 67 g/m^2.

Prop = Propagule type

1 = Sprigs

2 = Seeds

Rep = Replicate

Season

Spring = January through June.

Fall = July through December.

PART 1

Dependent variables versus Sampling date

PART 2

Dependent variables versus Elevation

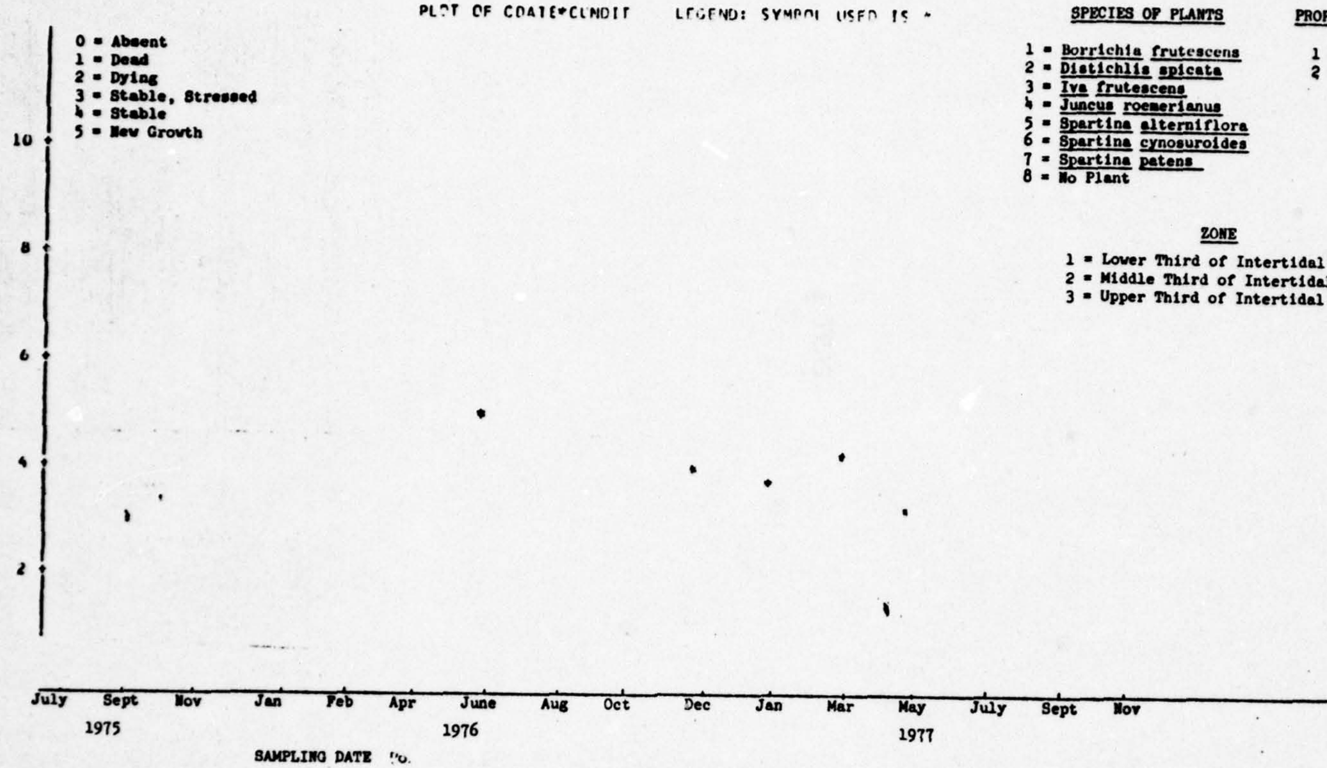
PART 3

Summary of species performance 1975-1977.

PART 1

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977   35
SPECIES=7   PROP=2   ZONE=3

PLOT OF CDATE*CONDIT   LEGEND: SYMBOL USED IS *



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

D4

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977   64
SPECIES=7   PROP=2   ZONE=3

PLOT OF CDATE=SH_HT   LEGEND: SYMBOL USED IS CHARACTER S
PLOT OF CDATE=FLOWER   LEGEND: SYMBOL USED IS CHARACTER F

SPECIES OF PLANTS

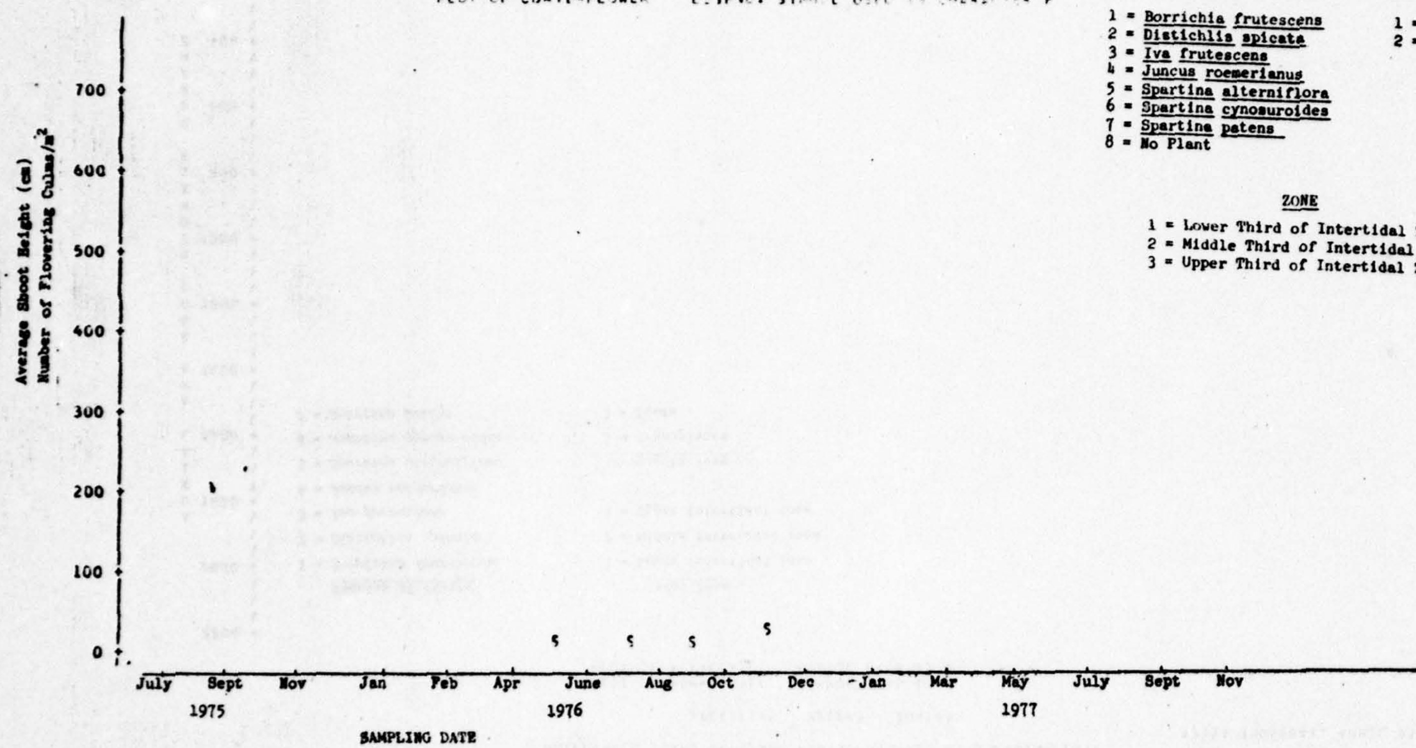
1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

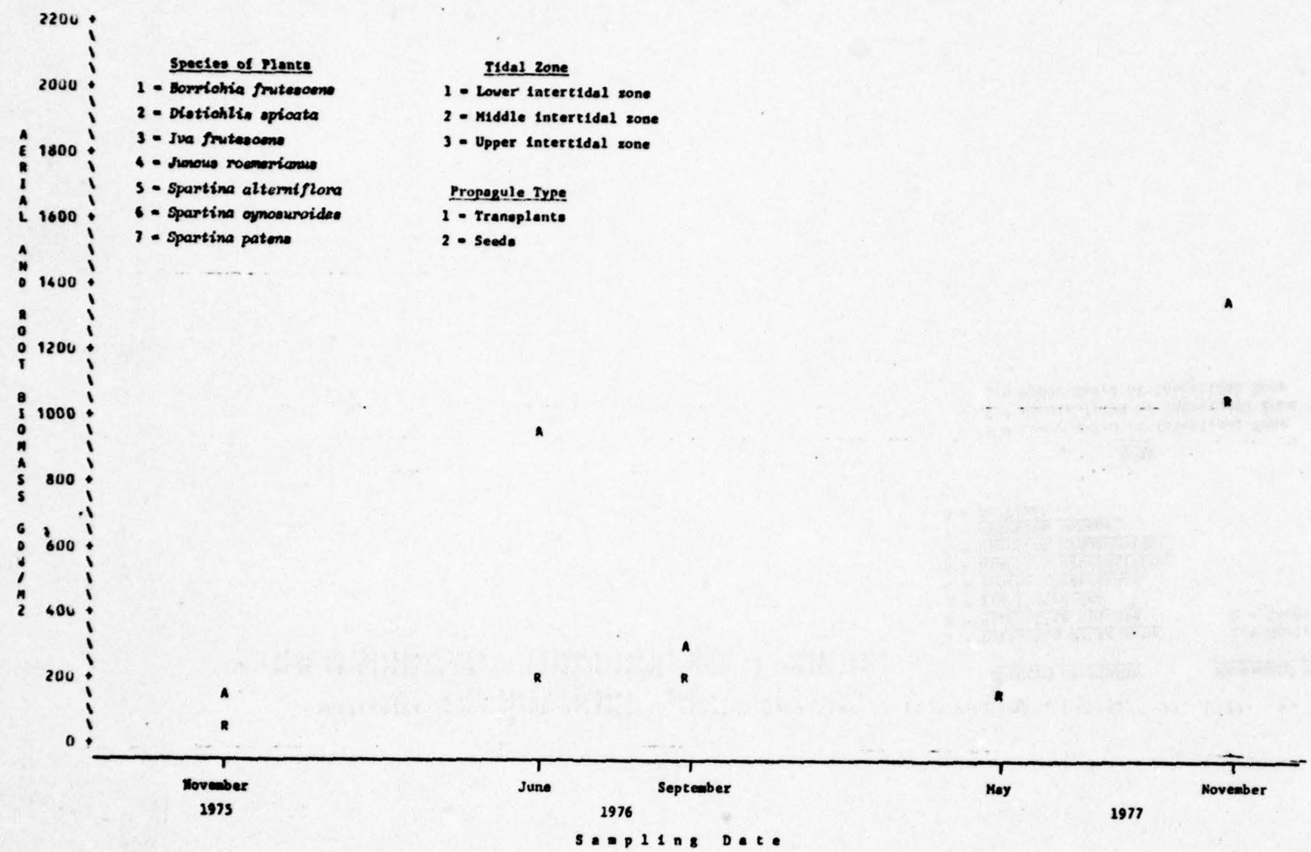


D5

BUTTERMILK SOUND ROOT AND AERIAL BIOMASS BY SAMPLING DATE   17:51 THURSDAY, APRIL 13, 1978   2

SPECIES=5   PROP=1   ZONE=1

PLOT OF NOM*CDATE   SYMBOL USED IS R
PLOT OF AER*CDATE   SYMBOL USED IS A



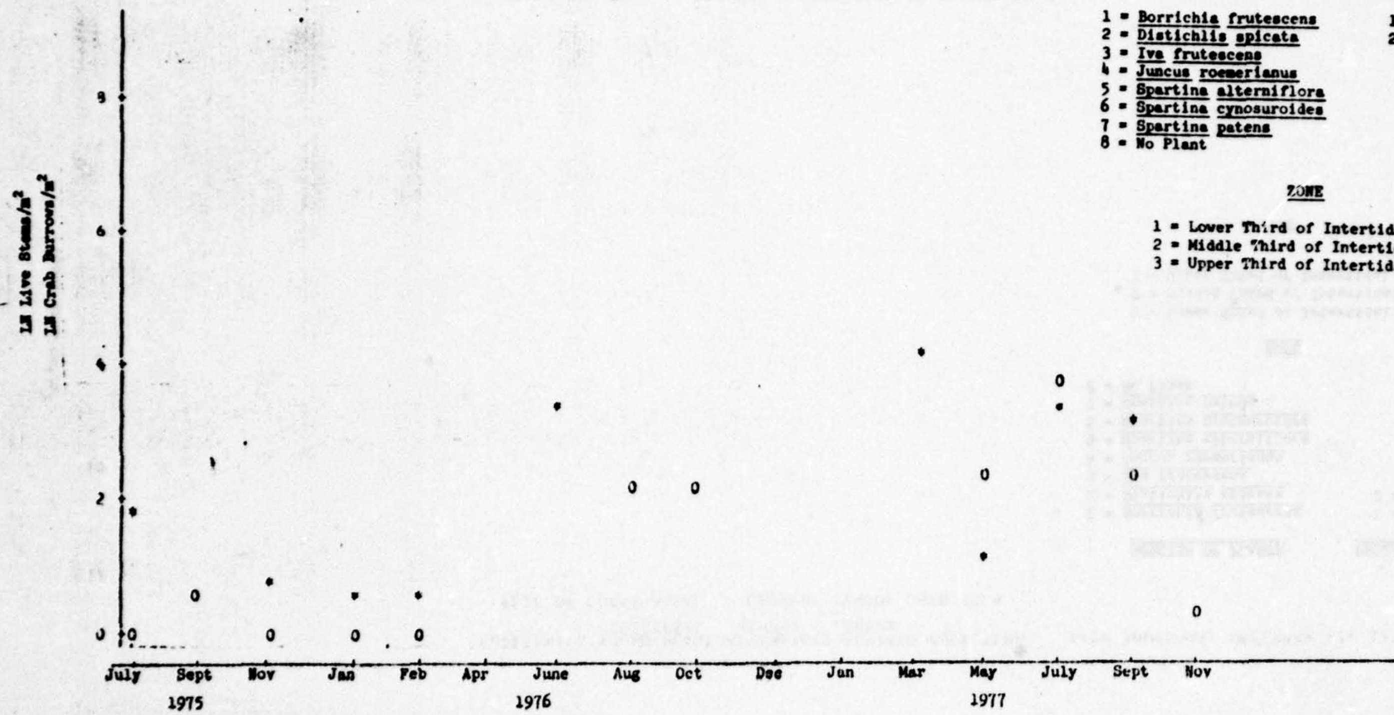
D6

NATURAL LOGARITHMIC PLOT IF CULM DENSITY AND CRAB BURROWS DENSITY WITH TIME

23:36 WEDNESDAY, DECEMBER 21, 1977 8

SPECIES=1 PROP=1 ZONE=2

PLOT OF CDATE*STEM_D LEGEND: SYMBOL USED IS CHARACTER *
PLOT OF CDATE*CRAB_BUR LEGEND: SYMBOL USED IS CHARACTER O



SPECIES OF PLANTS

1 = Borrichia frutescens
2 = Distichlis spicata
3 = Iva frutescens
4 = Juncus roemerianus
5 = Spartina alterniflora
6 = Spartina cynosuroides
7 = Spartina patens
8 = No Plant

PROPAGULE TYPE

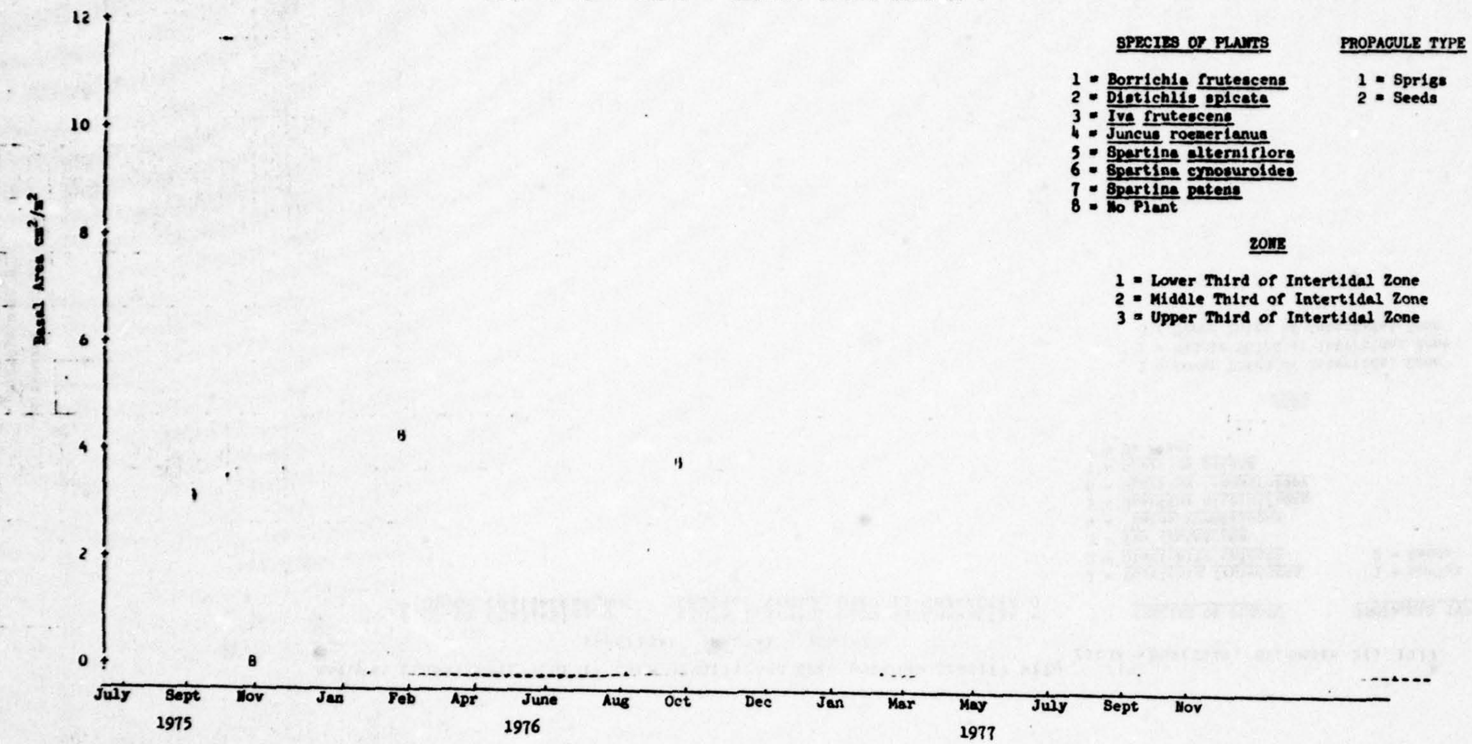
1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 1:19 THURSDAY, DECEMBER 22, 1977 123
SPECIES=1 PROP=1 ZONE=2

PLOT OF CDATE*BASAL LEGEND: SYMBOL USED IS B

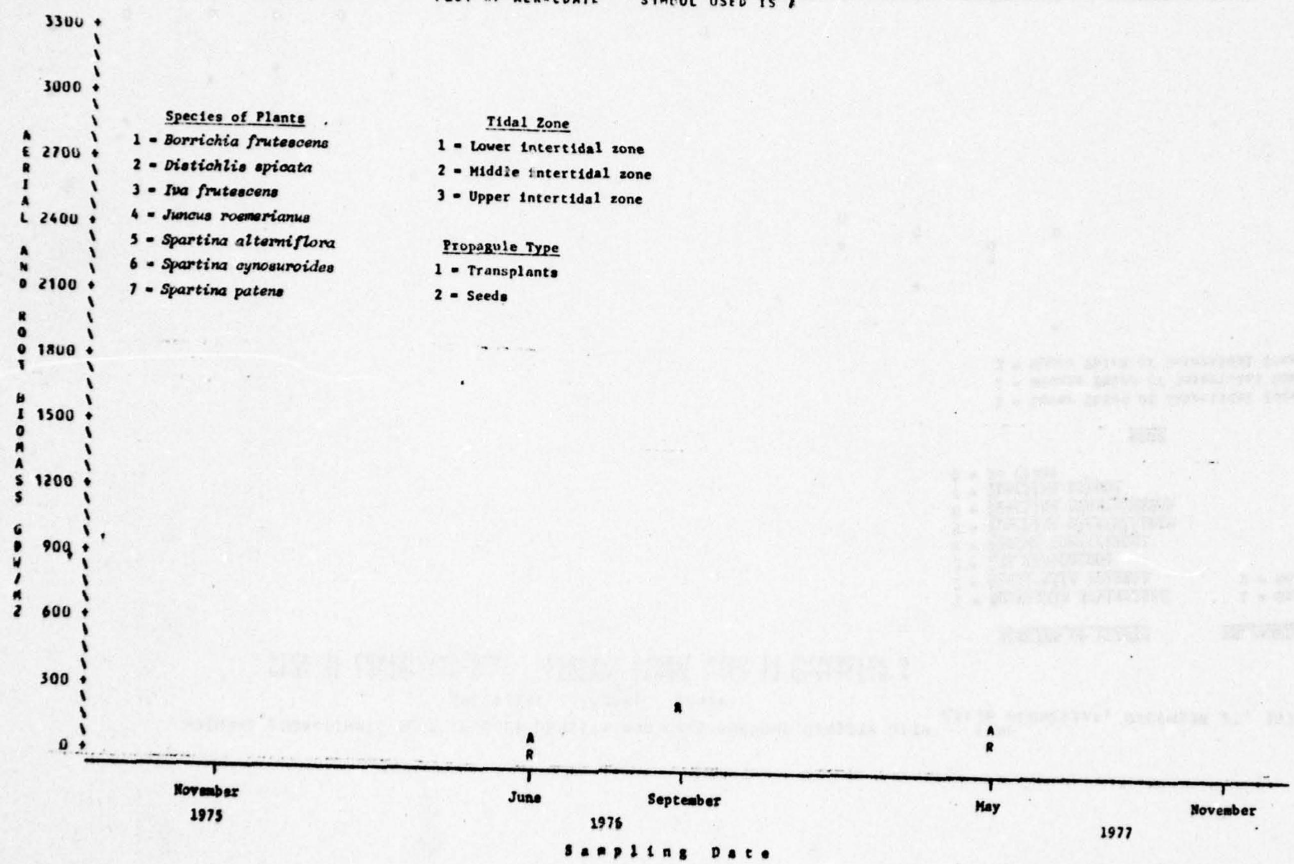


BUTTERMILK SOUND ROOT AND AERIAL BIOMASS BY SAMPLING DATE

17:35 THURSDAY, APRIL 13, 1978 4

SPECIES=1 PROP=1 ZONE=2

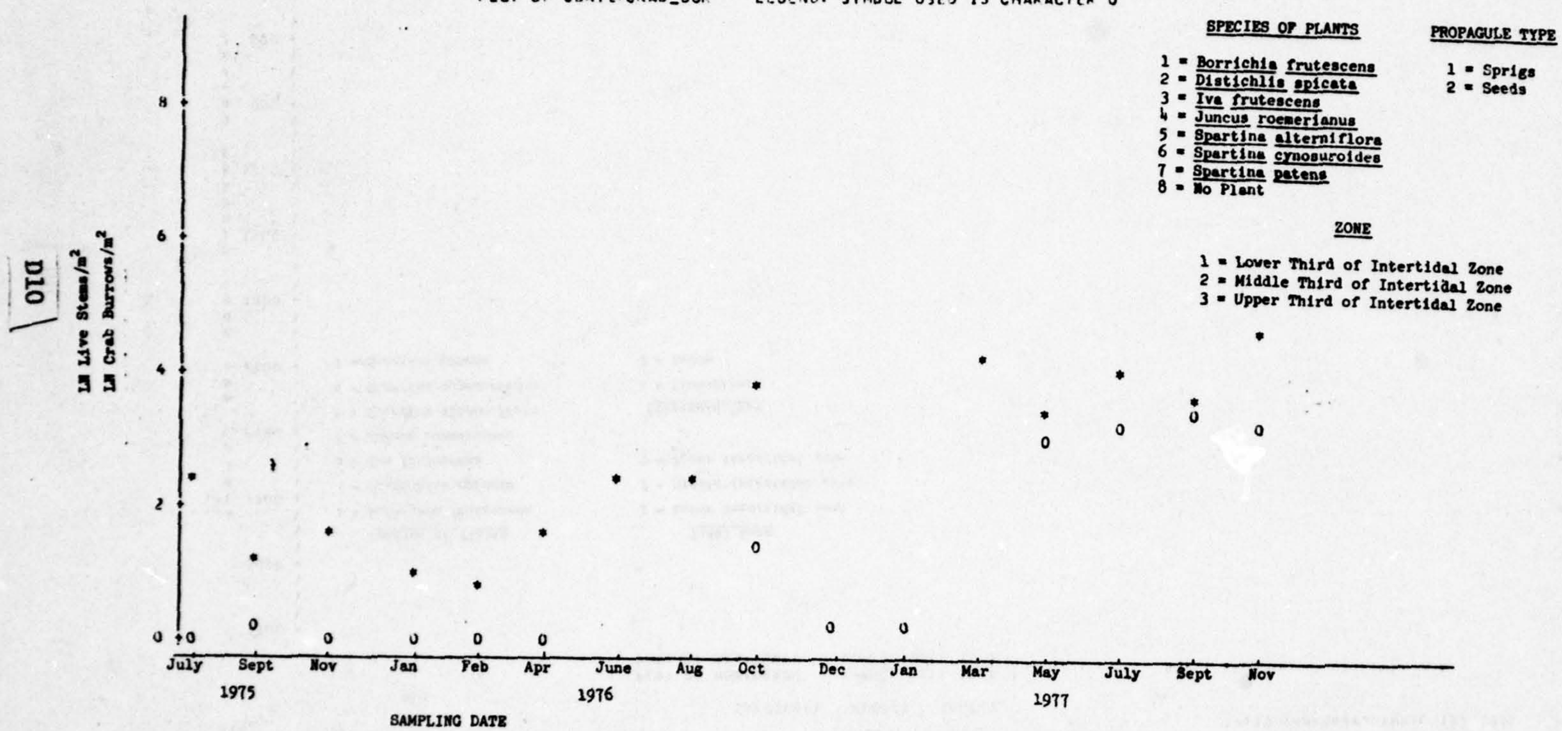
PLOT OF MOM*CDATE SYMBOL USED IS R
PLOT OF AER*CDATE SYMBOL USED IS A



NATURAL LOGARITHMIC PLOT IF CULM DENSITY AND CRAB BURROWS DENSITY WITH TIME

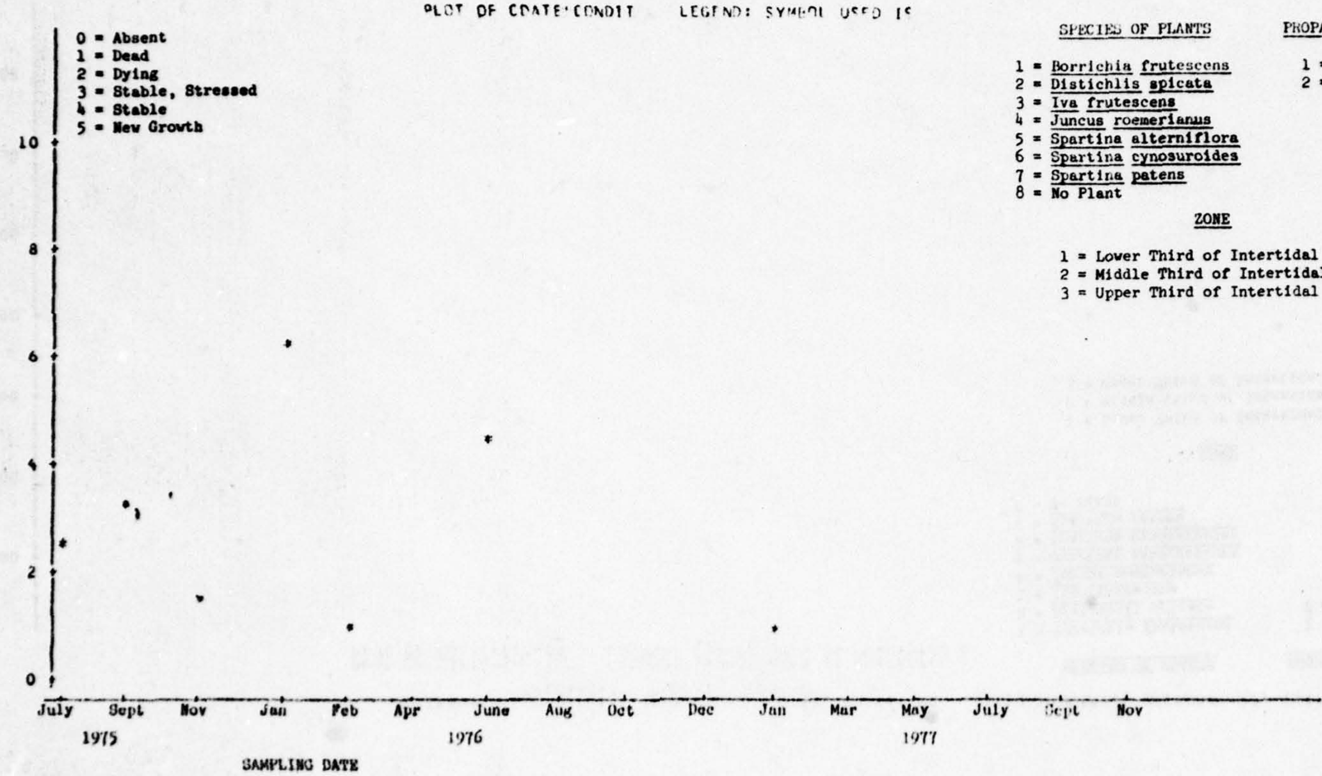
SPECIES=1 PROP=1 ZONE=3

PLOT OF CDATE*STEM_D LEGEND: SYMBOL USED IS CHARACTER *
PLOT OF CDATE*CRAB_BUR LEGEND: SYMBOL USED IS CHARACTER 0



BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977   32
SPECIES=7   PROP=1   ZONE=2

PLOT OF CDATE*CONDIT   LEGEND: SYMBOL USED IS



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

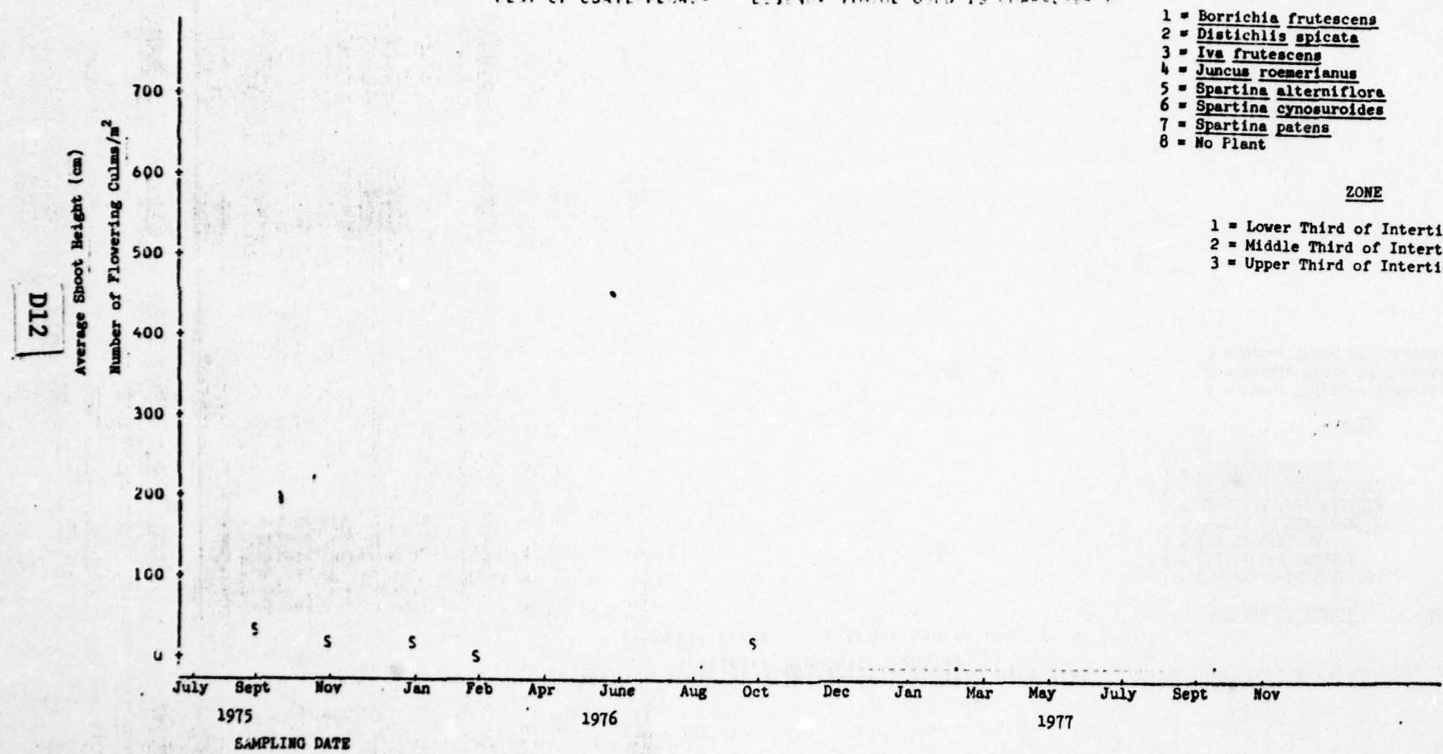
1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977   61
SPECIES=7   PROP=1   ZONE=2

PLOT OF SDATE*SH_HT   LEGEND: SYMBOL USED IS CHARACTER S
PLOT OF SDATE*FLOWER   LEGEND: SYMBOL USED IS CHARACTER F



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

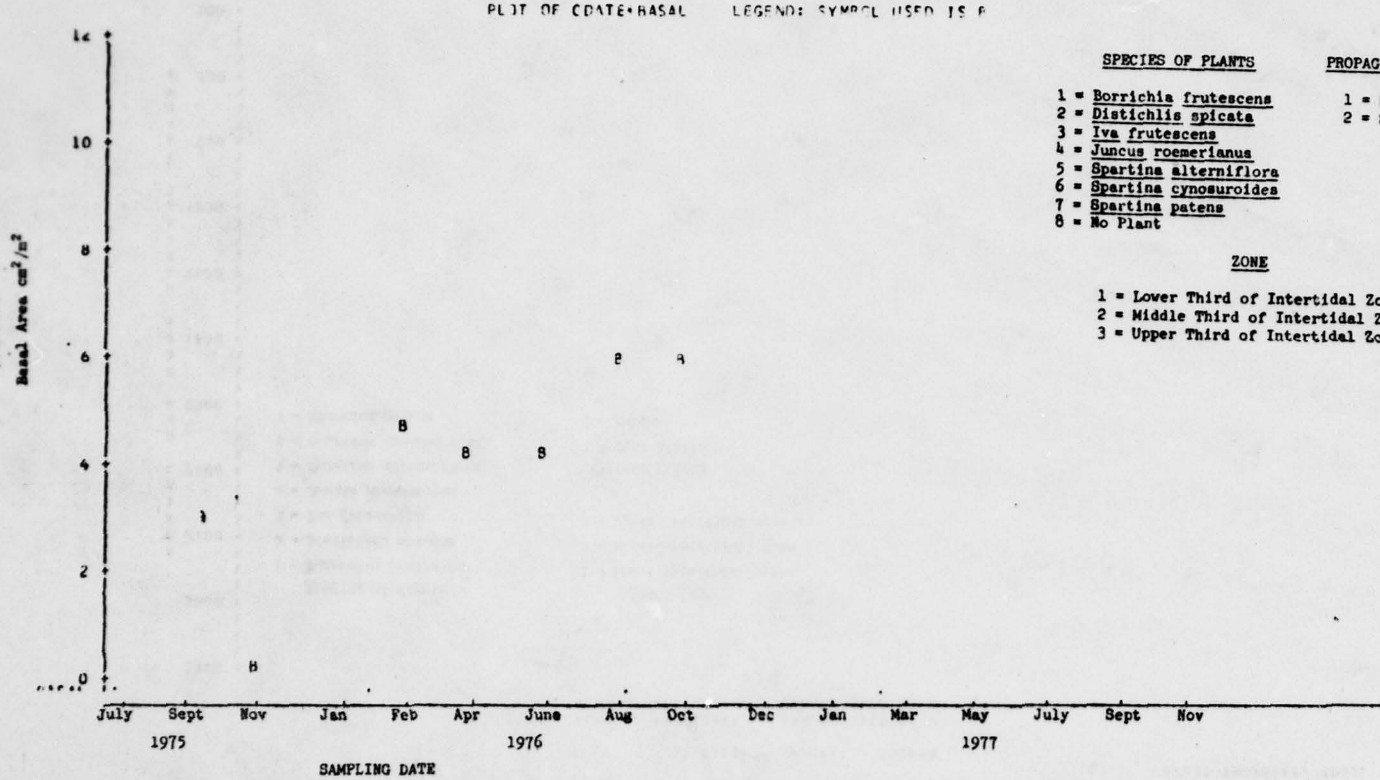
1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977 124
SPECIES=1   PROP=1   ZONE=3

PLOT OF CDATE*BASAL   LEGEND: SYMBOL USED IS B



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

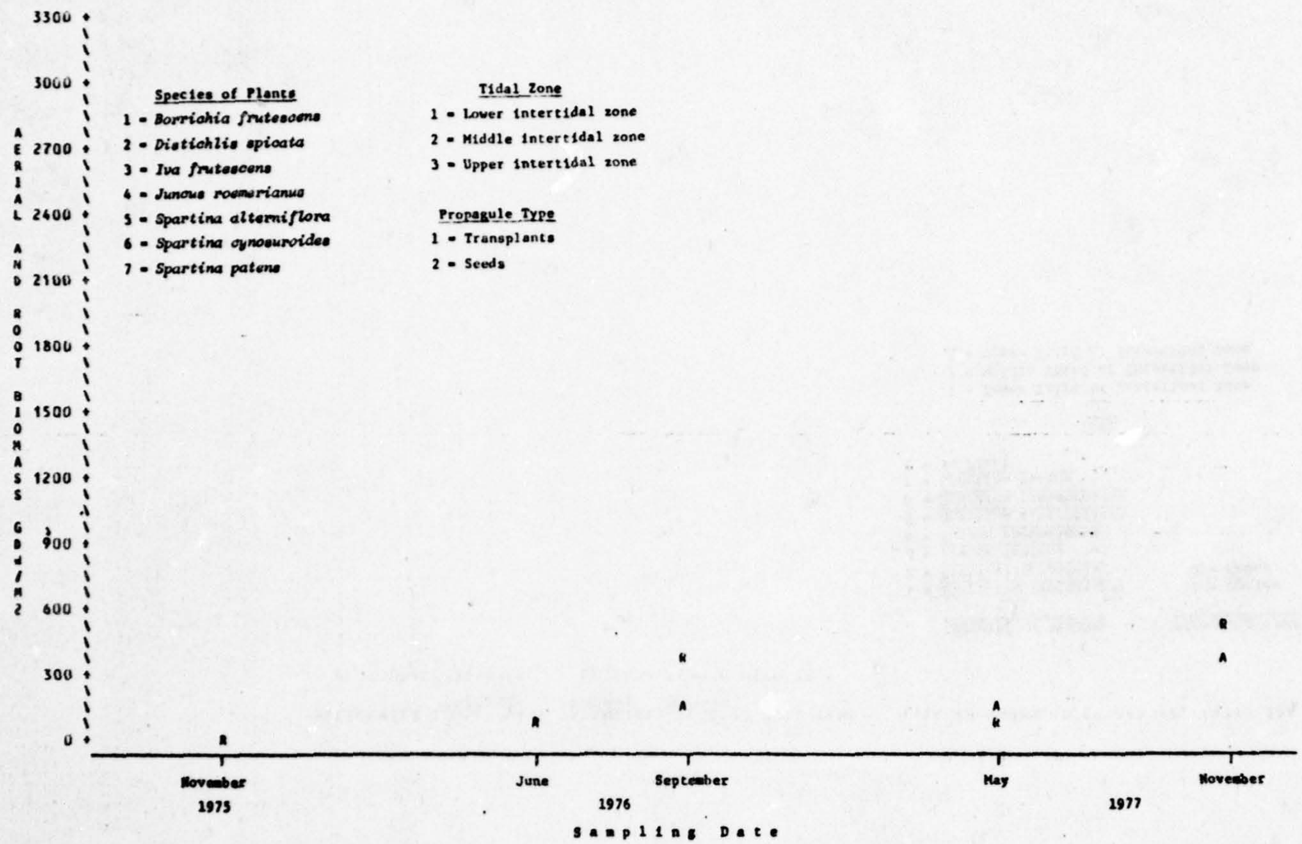
ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

BUTTERMILK SOUND ROOT AND AERIAL BIOMASS BY SAMPLING DATE 17:35 THURSDAY, APRIL 13, 1978 5

SPECIES=1 PROP=1 ZONE=3

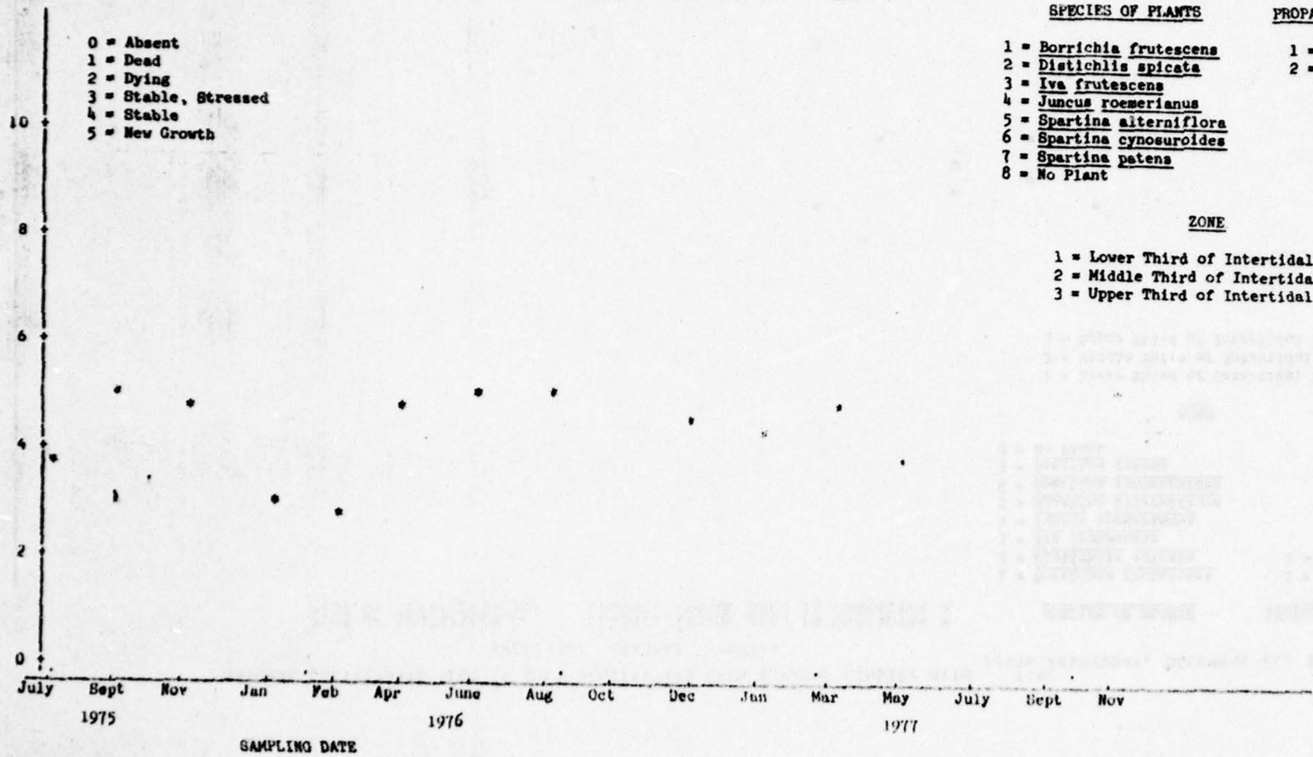
PLOT OF ROM*CDATE SYMBOL USED IS R
PLOT OF AER*CDATE SYMBOL USED IS A



BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 1:19 THURSDAY, DECEMBER 22, 1977 8

SPECIES=1 PROP=1 ZONE=3

PLOT OF CDATE*CONDIT LEGEND: SYMBOL USED IS ·



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

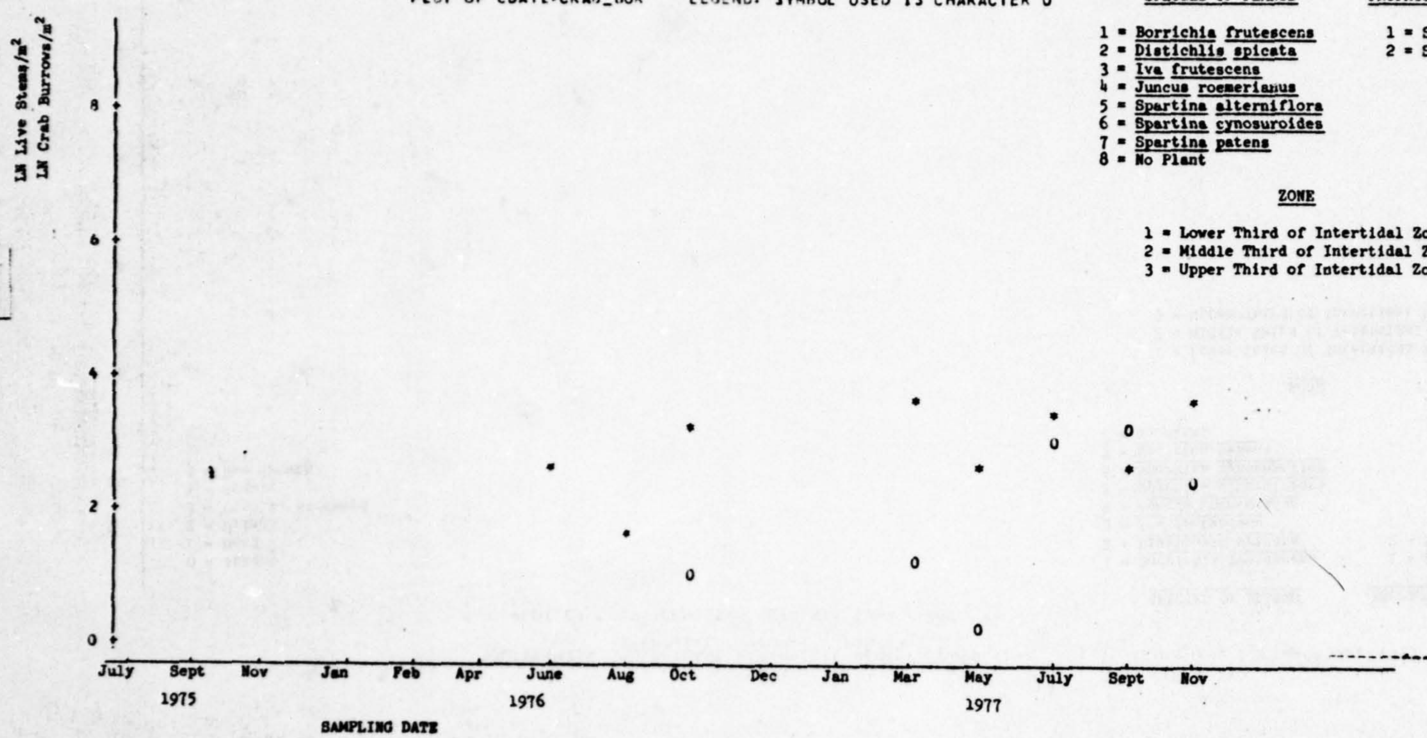
ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

NATURAL LOGARITHMIC PLOT IF CULM DENSITY AND CRAB BURROWS DENSITY WITH TIME 23:36 WEDNESDAY, DECEMBER 21, 1977 11

SPECIES=1 PROP=2 ZONE=3

PLOT OF CDATE*STEM_D LEGEND: SYMBOL USED IS CHARACTER *
PLOT OF CDATE*CRAB_BUR LEGEND: SYMBOL USED IS CHARACTER 0



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

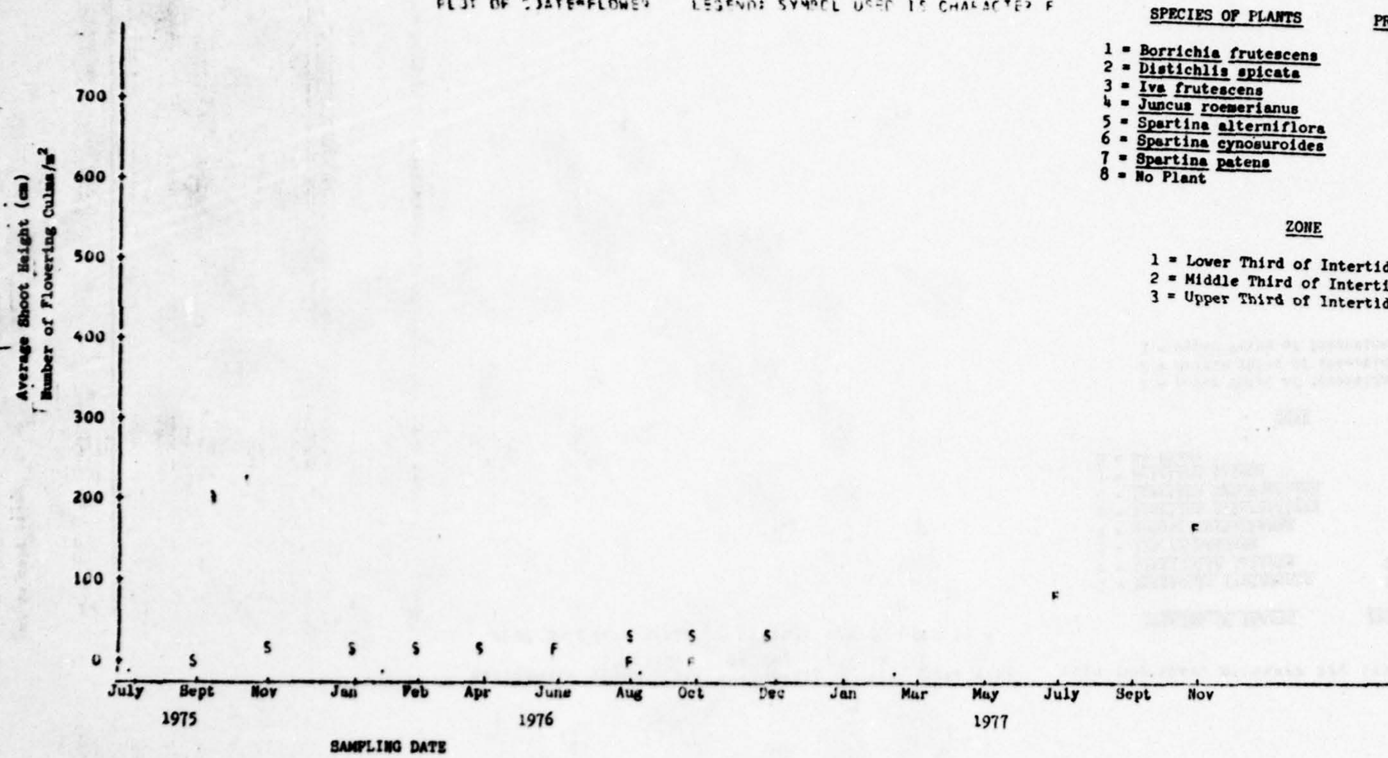
ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

D16

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977   37
SPECIES=1   PROP=1   ZONE=3

PLOT OF DATE*SH_HT   LEGEND: SYMBOL USED IS CHARACTER S
PLOT OF DATE*FLOWER   LEGEND: SYMBOL USED IS CHARACTER F



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

ZONE

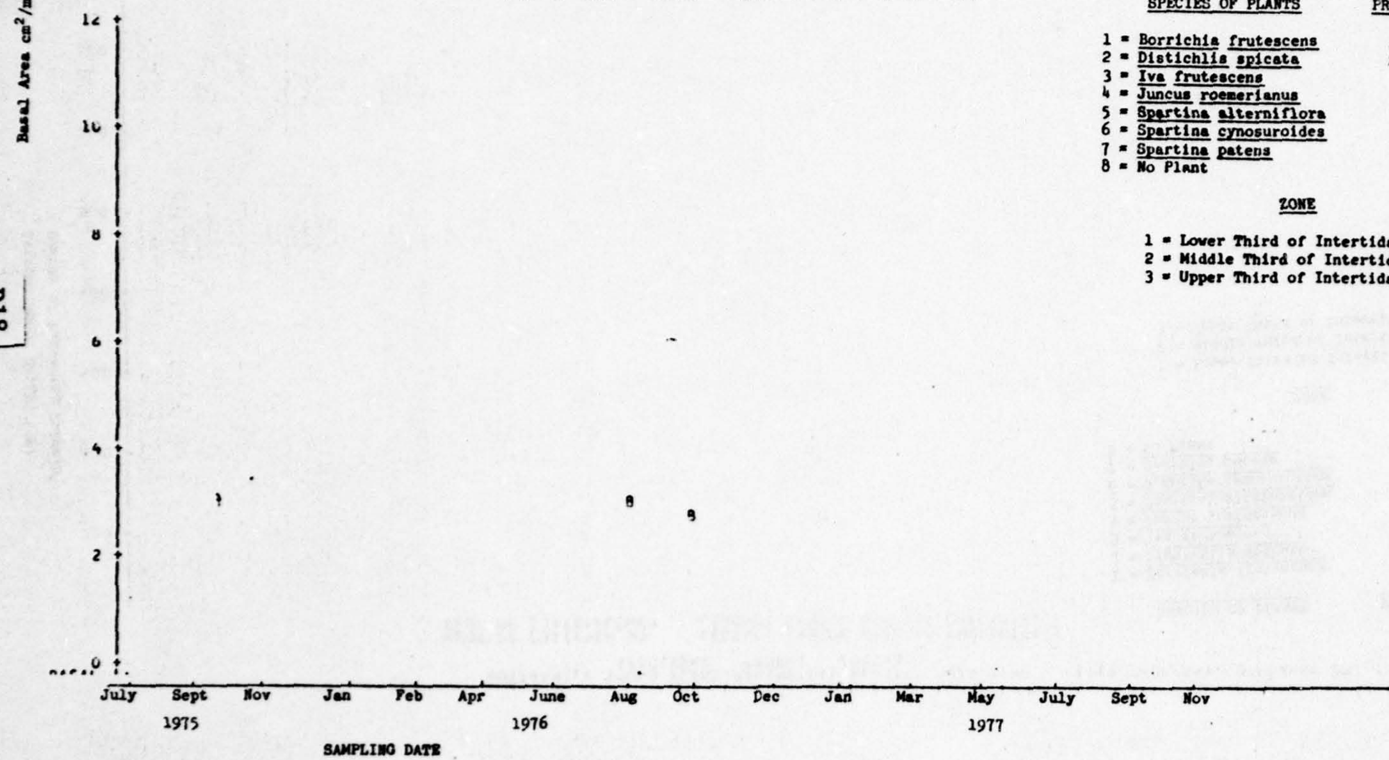
1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

D17

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 1:19 THURSDAY, DECEMBER 22, 1977 126

SPECIES=1 PROP=2 ZONE=3

PLOT OF CDATE*BASAL LEGEND: SYMBOL USED IS 8



SPECIES OF PLANTS

1 = Borrichia frutescens
2 = Distichlis spicata
3 = Iva frutescens
4 = Juncus roemerianus
5 = Spartina alterniflora
6 = Spartina cynosuroides
7 = Spartina patens
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

ZONE

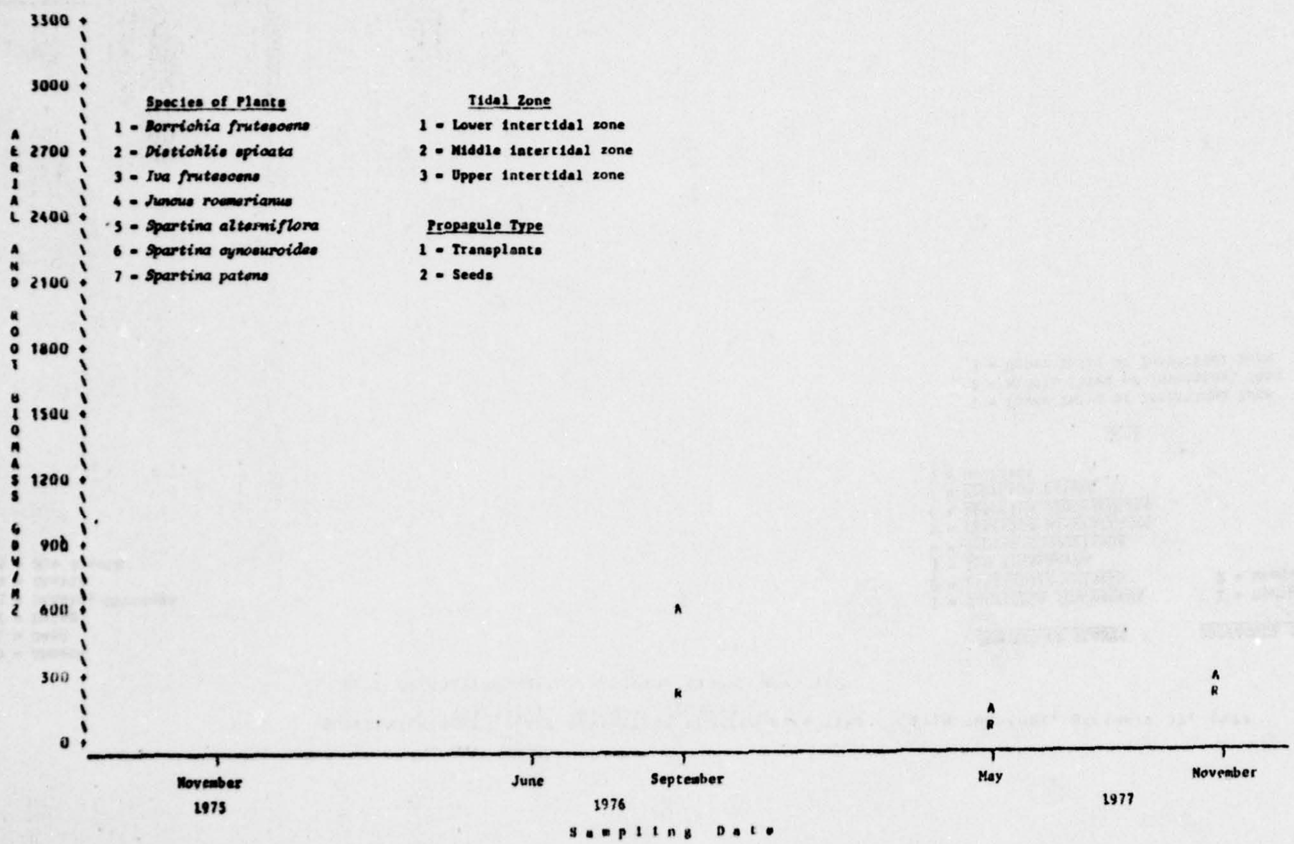
1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

D18

BUTTERMILK SOUND ROOT AND AERIAL BIOMASS BY SAMPLING DATE 17:35 THURSDAY, APRIL 13, 1978

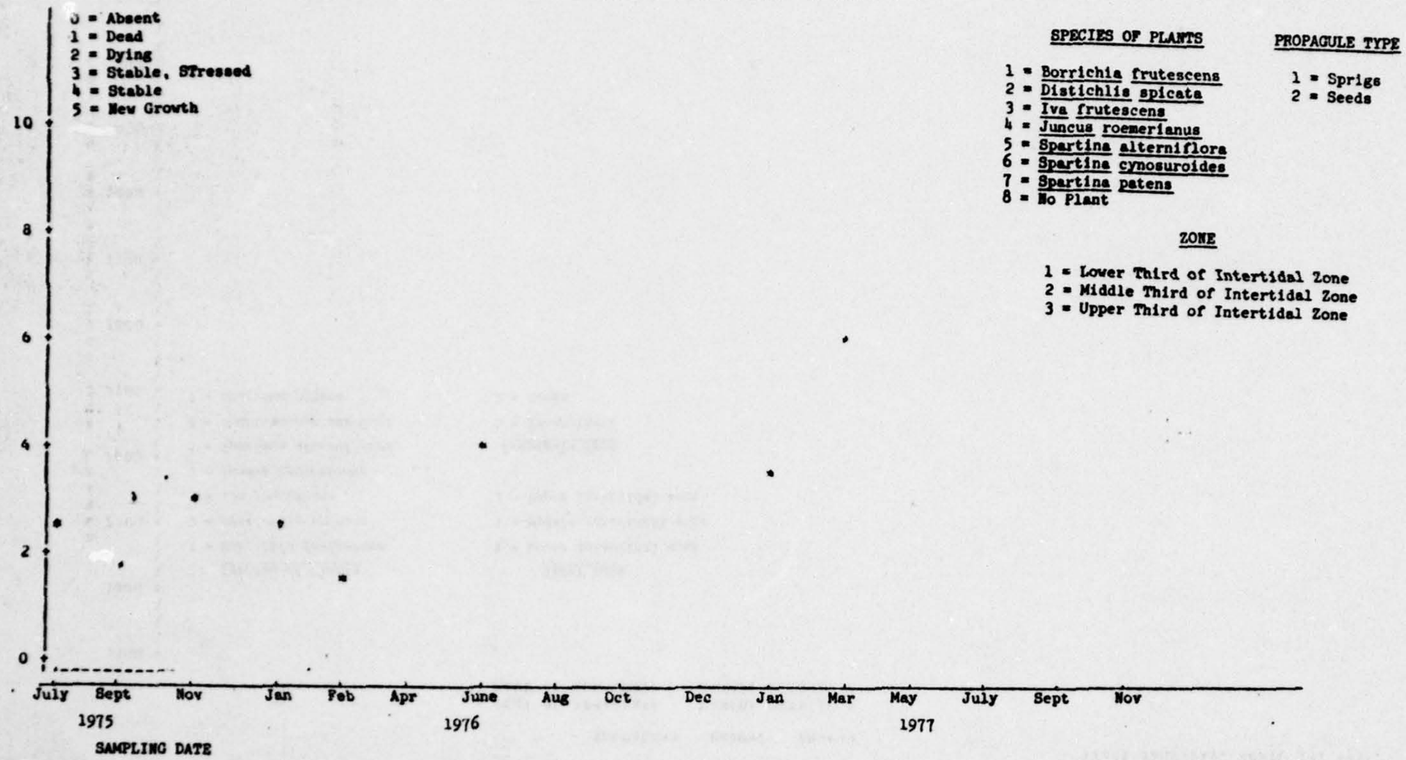
SPECIES=1 PROP=2 ZONE=3

PLOT OF ROM*CDATE SYMBOL USED IS R
PLOT OF AER*CDATE SYMBOL USED IS A



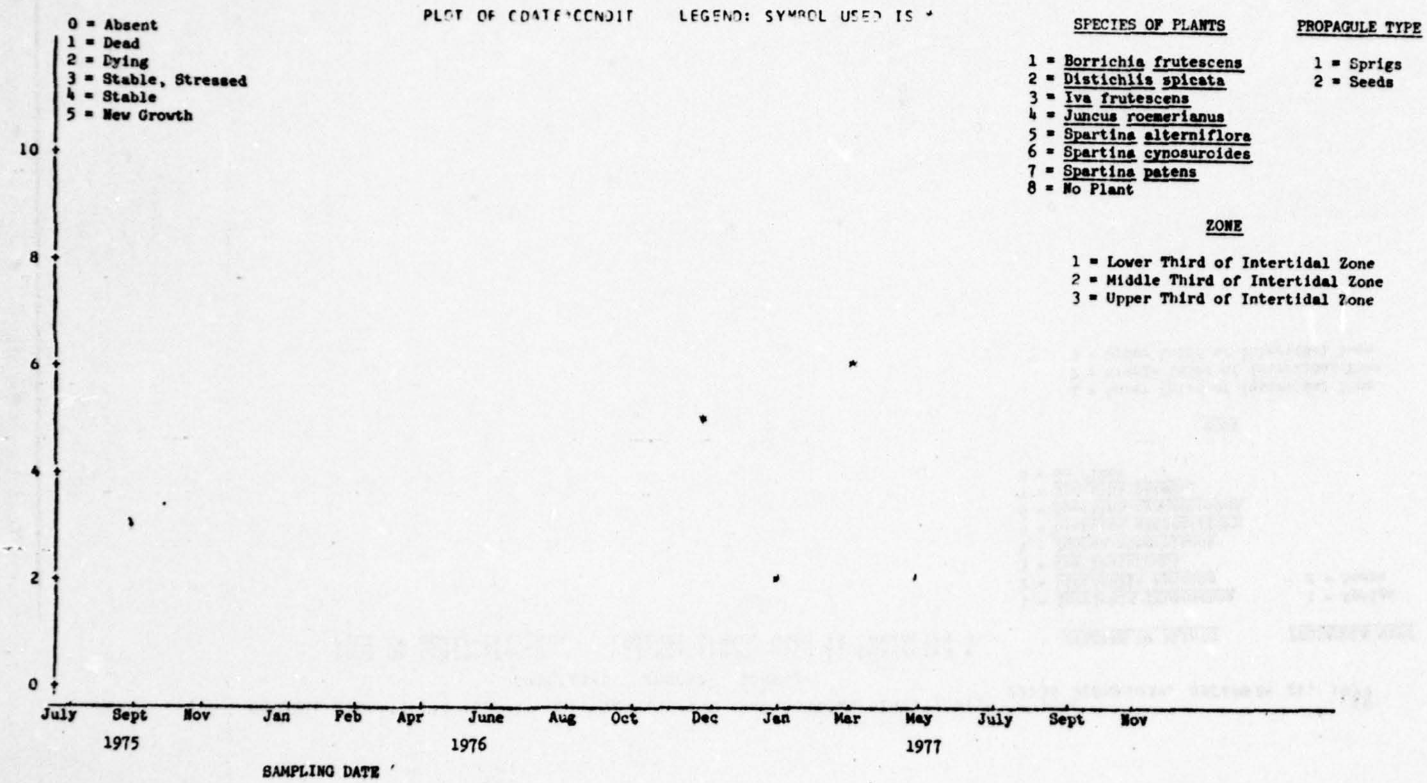
BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977   7
SPECIES=1   PROP=1   ZONE=2

PLOT OF CDATE*CONDIT   LEGEND: SYMBOL USED IS •



BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977   9
SPECIES=1   PROP=2   ZONE=2

PLOT OF CDATE*CONDIT   LEGEND: SYMBOL USED IS *

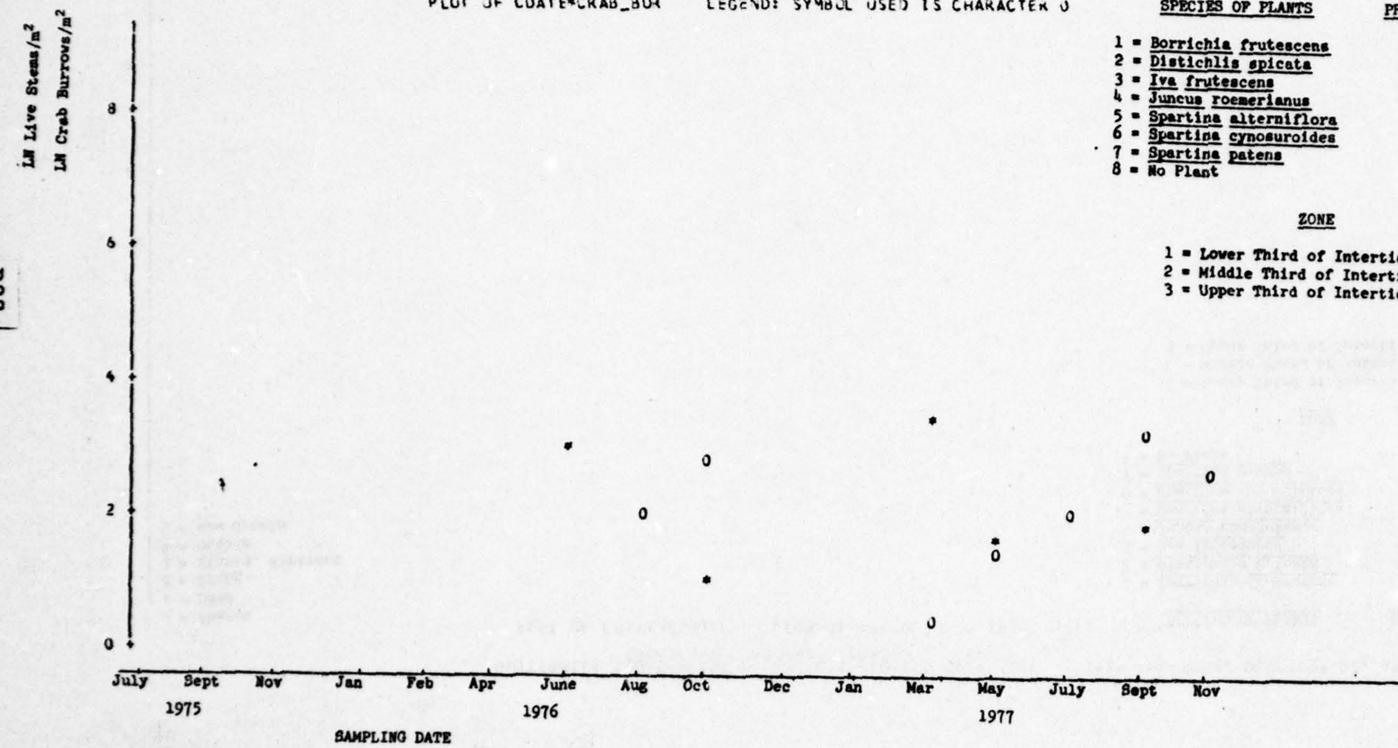


NATURAL LOGARITHMIC PLOT IF CULM DENSITY AND CRAB BURROWS DENSITY WITH TIME

SPECIES=1 PROP=2 ZONE=2

23:36 WEDNESDAY, DECEMBER 21, 1977 10

PLOT OF CDATE*STEM_D LEGEND: SYMBOL USED IS CHARACTER *
PLOT OF CDATE*CRAB_BUR LEGEND: SYMBOL USED IS CHARACTER 0



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

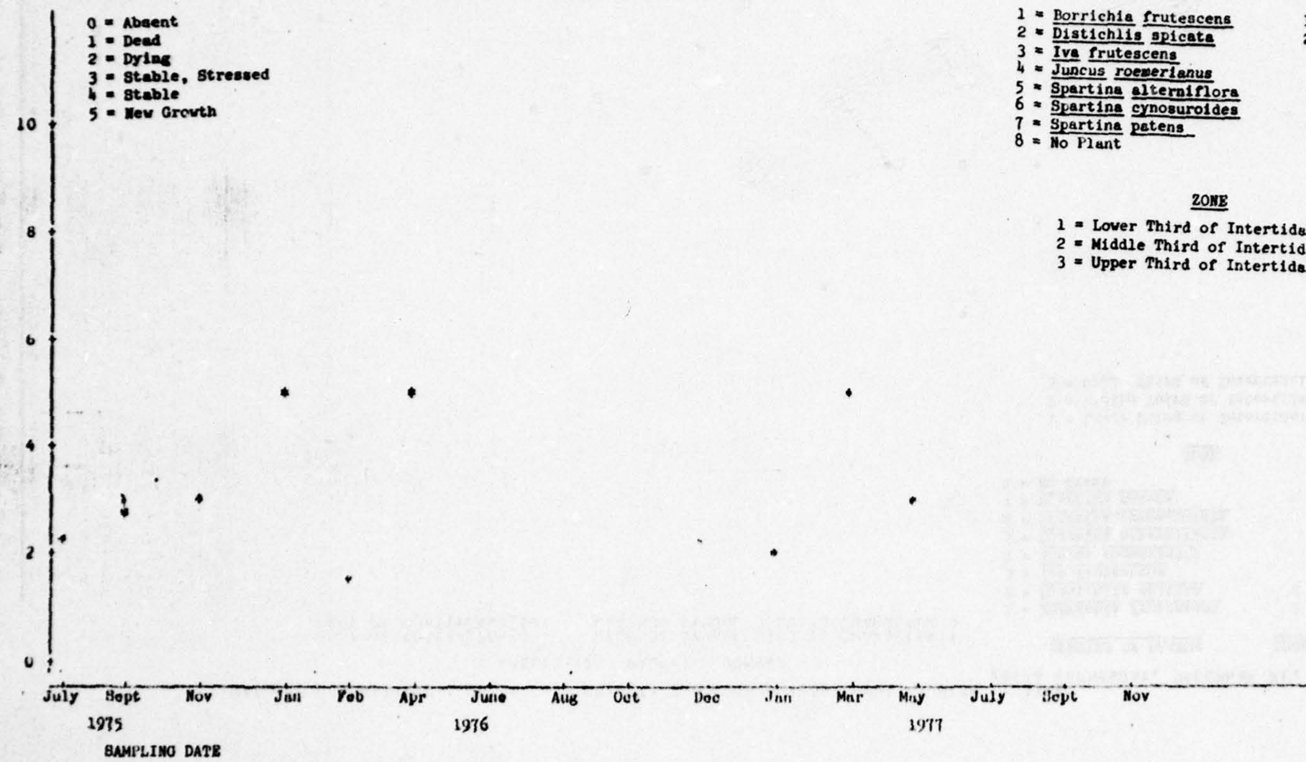
ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

D22

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977   11
SPECIES=2   PROP=1   ZONE=2

PLOT OF CDATE CONDIT   LEGEND: SYMBOL USED IS *



SPECIES OF PLANTS

1 = Borrichia frutescens
2 = Distichlis spicata
3 = Iva frutescens
4 = Juncus roemerianus
5 = Spartina alterniflora
6 = Spartina cynosuroides
7 = Spartina patens
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

NATURAL LOGARITHMIC PLOT IF CULM DENSITY AND CRAB BURROWS DENSITY WITH TIME

23:36 WEDNESDAY, DECEMBER 21, 1977 12

SPECIES=2 PROP=1 ZONE=2

PLOT OF CDATE*STEM_D LEGEND: SYMBOL USED IS CHARACTER *
PLOT OF CDATE*CRAB_BUR LEGEND: SYMBOL USED IS CHARACTER 0

SPECIES OF PLANTS

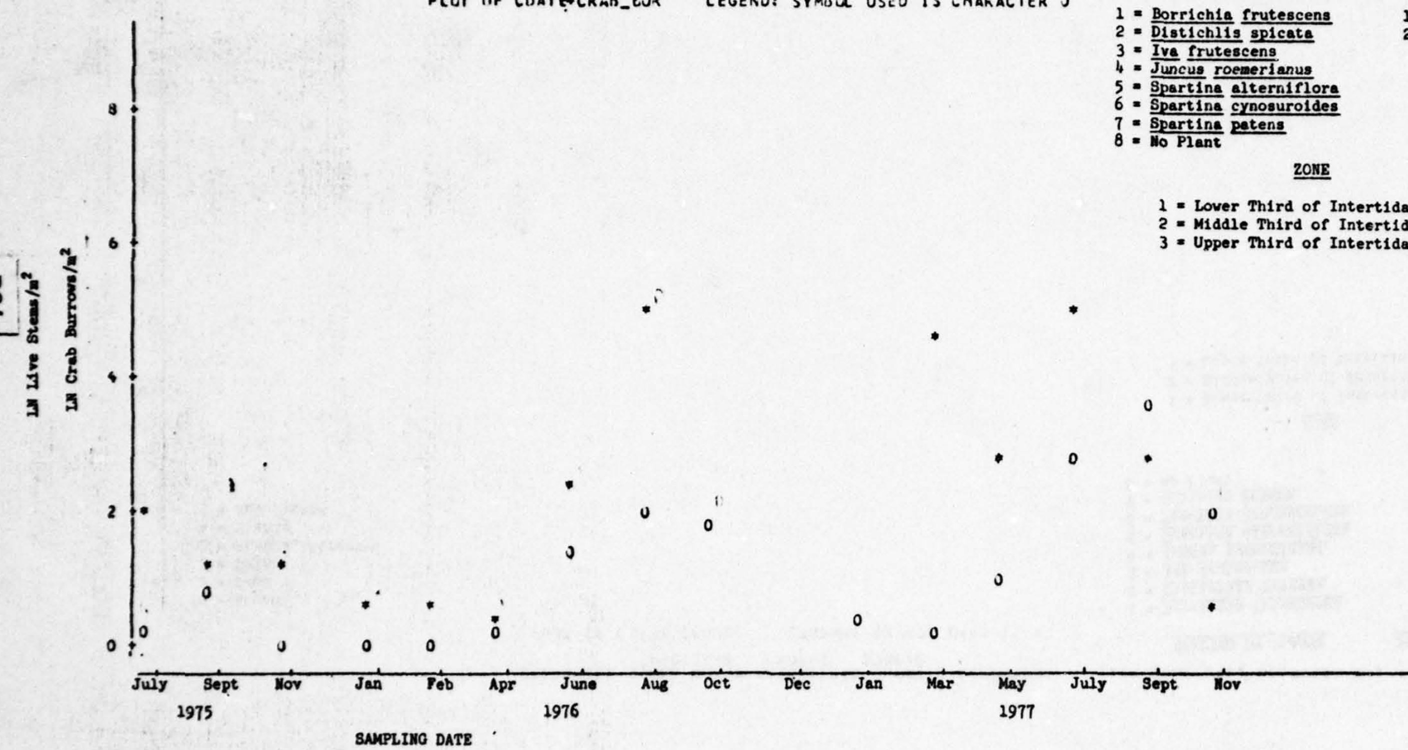
1 = Borrichia frutescens
2 = Distichlis spicata
3 = Iva frutescens
4 = Juncus roemerianus
5 = Spartina alterniflora
6 = Spartina cynosuroides
7 = Spartina patens
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

ZONE

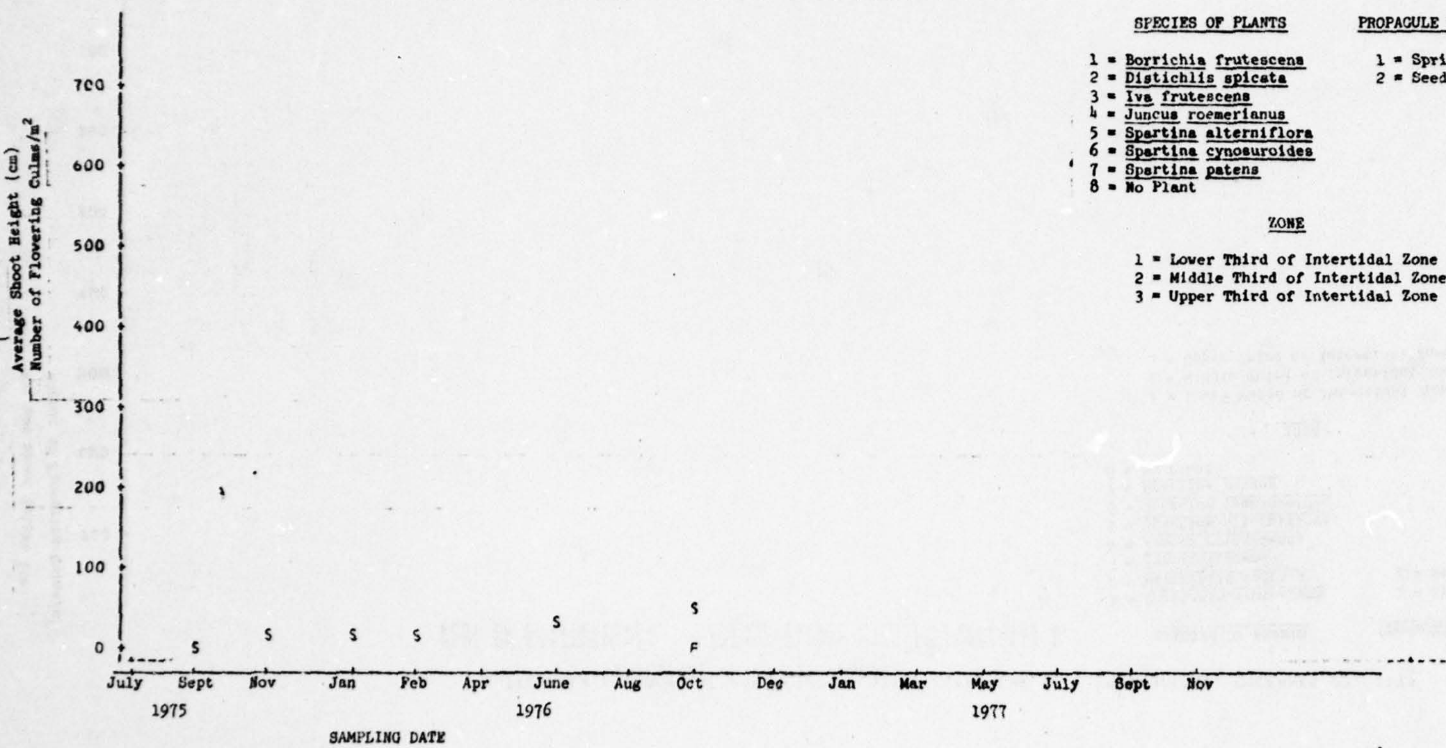
1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone



D24

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 1:19 THURSDAY, DECEMBER 22, 1977 36
SPECIES=1 PROP=1 ZONE=2

PLOT OF CDATE*SH_HT LEGEND: SYMBOL USED IS CHARACTER S
PLOT OF CDATE*FLOWER LEGEND: SYMBOL USED IS CHARACTER F



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

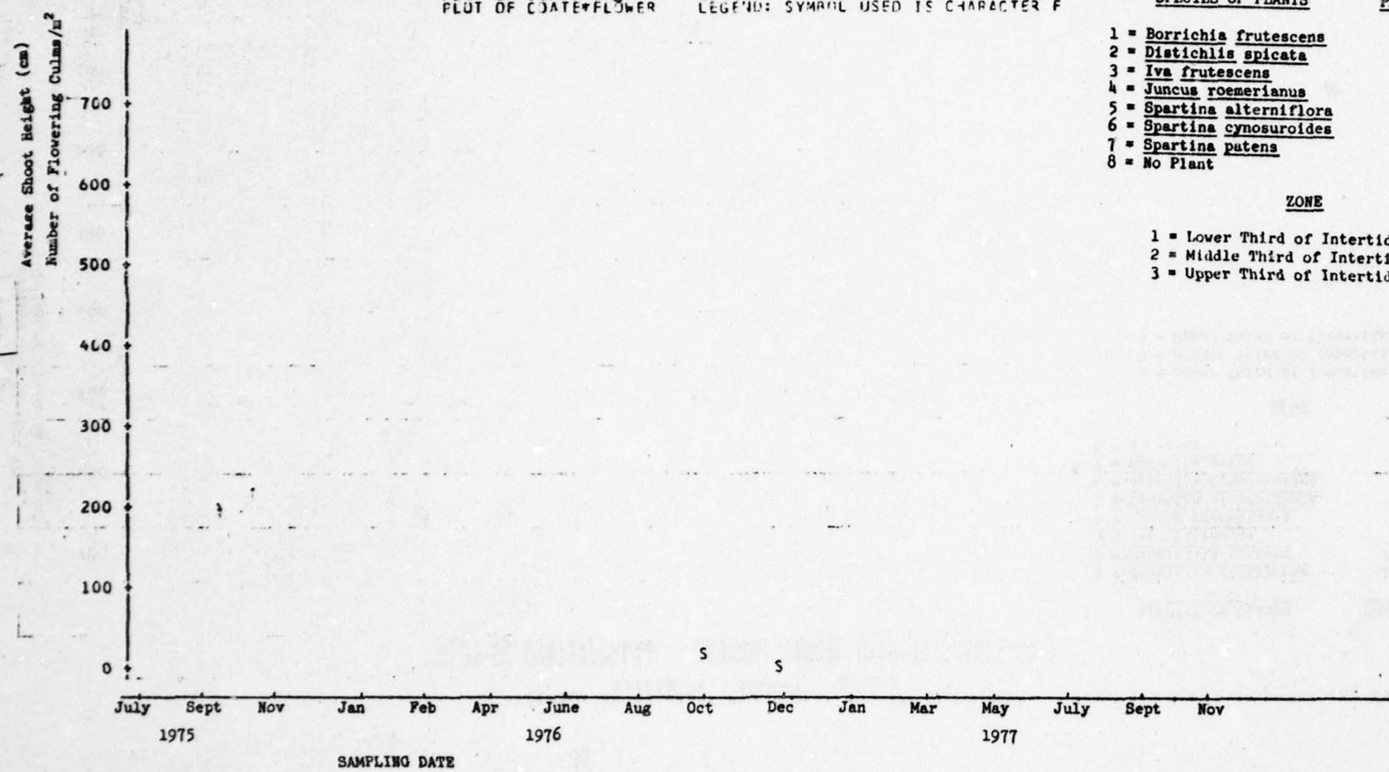
1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 1:19 THURSDAY, DECEMBER 22, 1977 38
SPECIES=1 PROP=2 ZONE=2

PLOT OF CDATE*SH_HT LEGEND: SYMBOL USED IS CHARACTER S
PLOT OF CDATE*FLOWER LEGEND: SYMBOL USED IS CHARACTER F



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

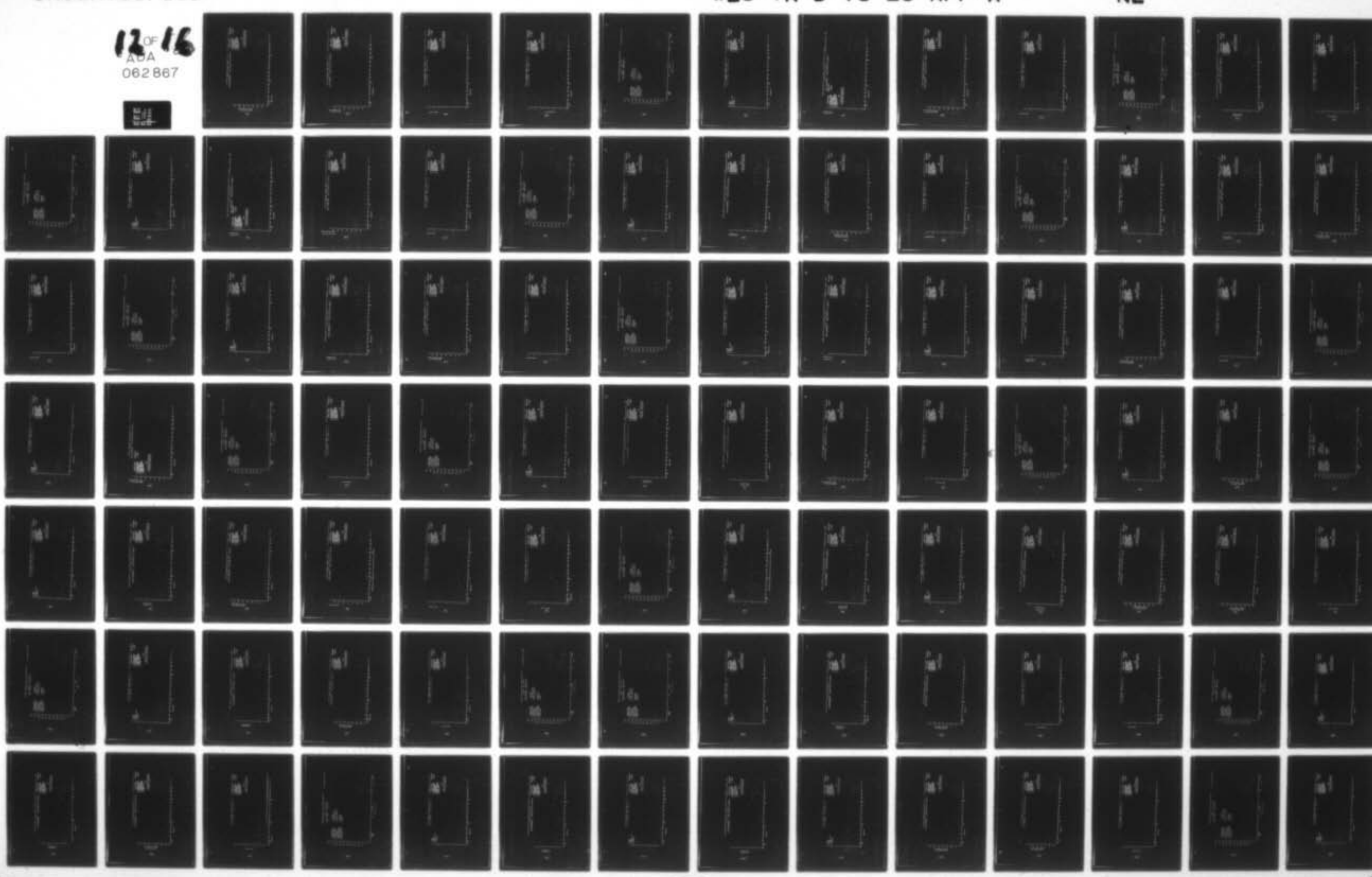
ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

AD-A062 867 GEORGIA UNIV BRUNSWICK MARINE EXTENSION SERVICE F/G 13/2
HABITAT DEVELOPMENT FIELD INVESTIGATIONS BUTTERMILK SOUND MARSH--ETC(U)
JUL 78 R J REIMOLD, M A HARDISKY, P C ADAMS DACW21-75-C-0074

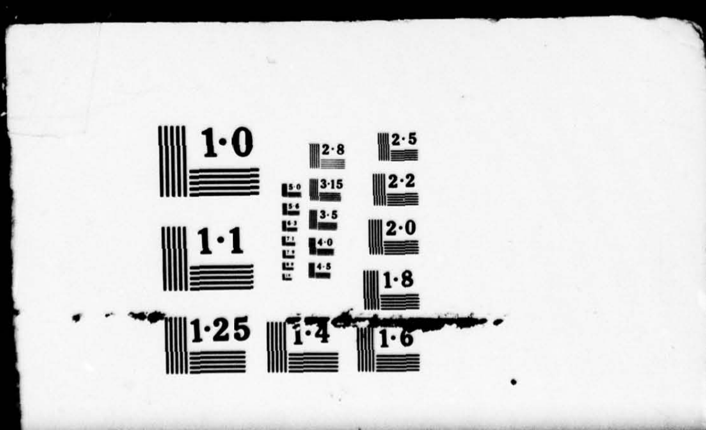
UNCLASSIFIED WES-TR-D-78-26-APP-A NL

12 OF 16
AD A
062867



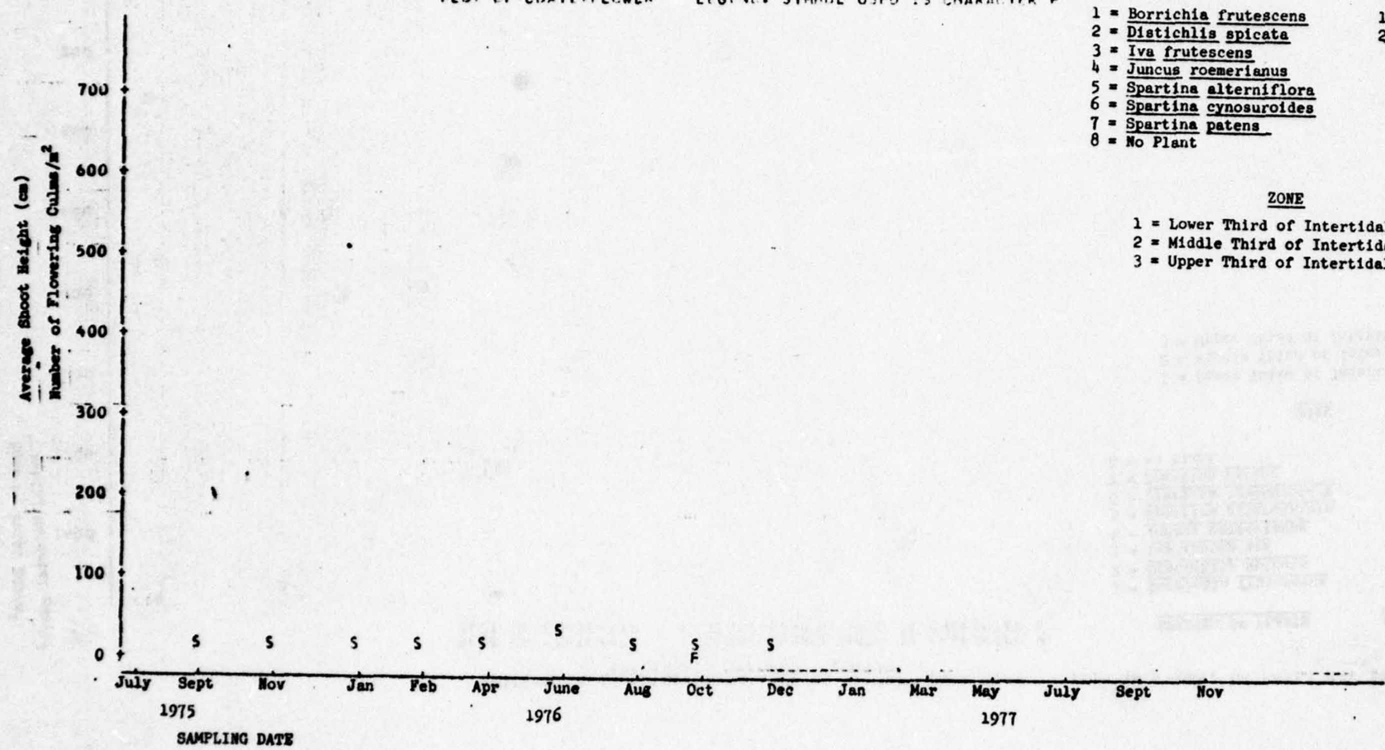
12 OF 16

ADA
062867



BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977   40
SPECIES=2   PROP=1   ZONE=2

PLOT OF CDATE*SH_HT   LEGEND: SYMBOL USED IS CHARACTER S
PLOT OF CDATE*FLOWER   LEGEND: SYMBOL USED IS CHARACTER F



SPECIES OF PLANTS

1 = Borrichia frutescens
2 = Distichlis spicata
3 = Iva frutescens
4 = Juncus roemerianus
5 = Spartina alterniflora
6 = Spartina cynosuroides
7 = Spartina patens
8 = No Plant

PROPAGULE TYPE

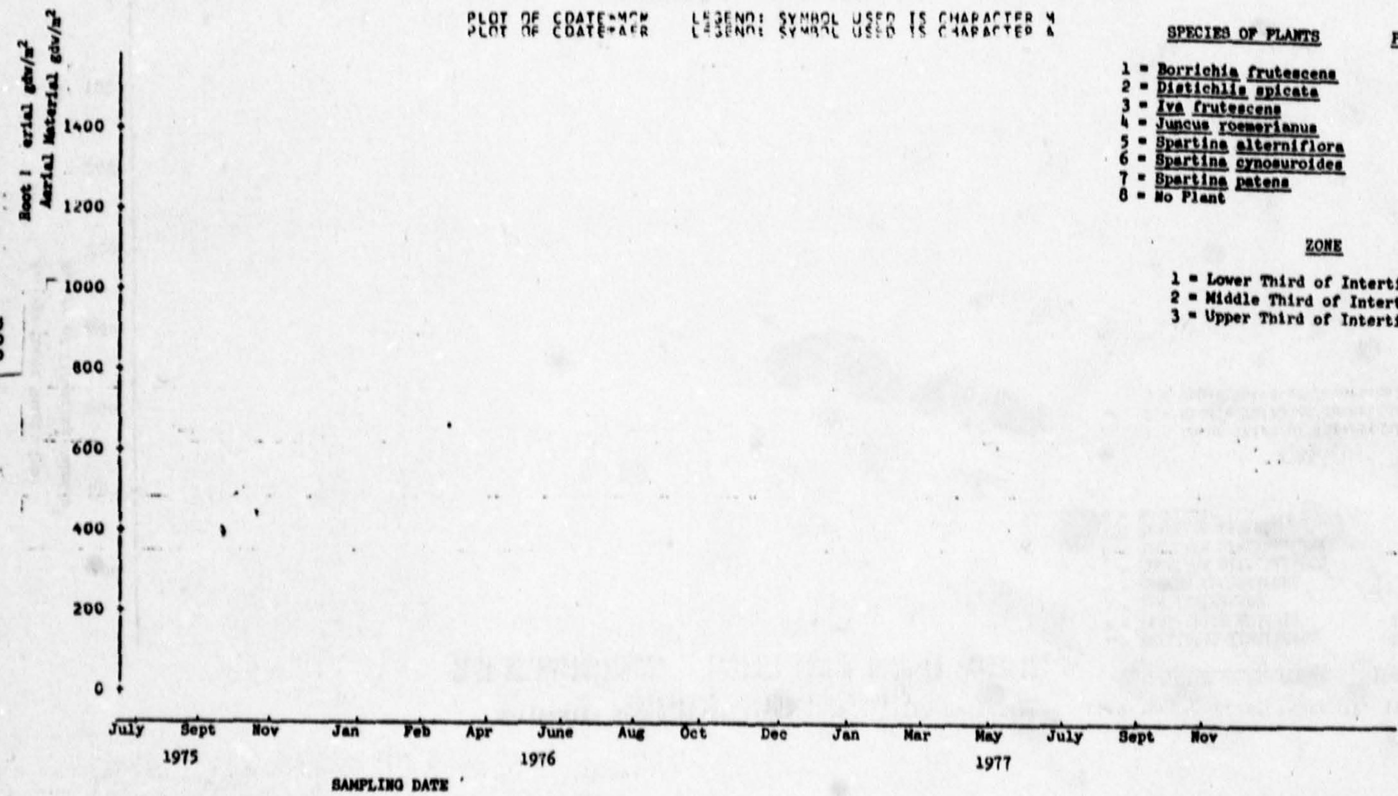
1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 1:19 THURSDAY, DECEMBER 22, 1977 96
SPECIES=1 PROP=2 ZONE=2

PLOT OF CDATE*MCW LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF CDATE*AER LEGEND: SYMBOL USED IS CHARACTER A



D28

SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

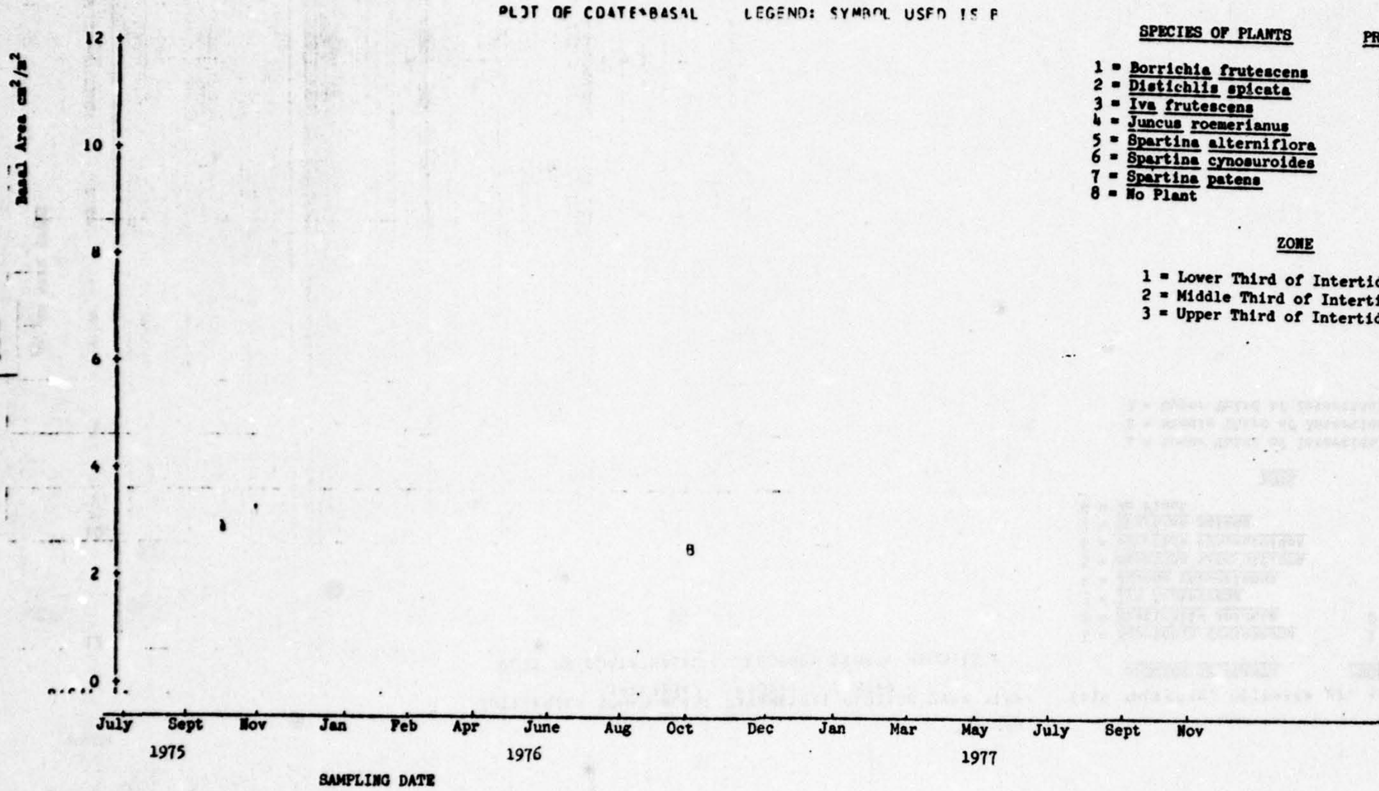
1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 1:19 THURSDAY, DECEMBER 22, 1977 125
SPECIES=1 PROP=2 ZONE=2

PLOT OF COATE*BASAL LEGEND: SYMBOL USED IS B



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

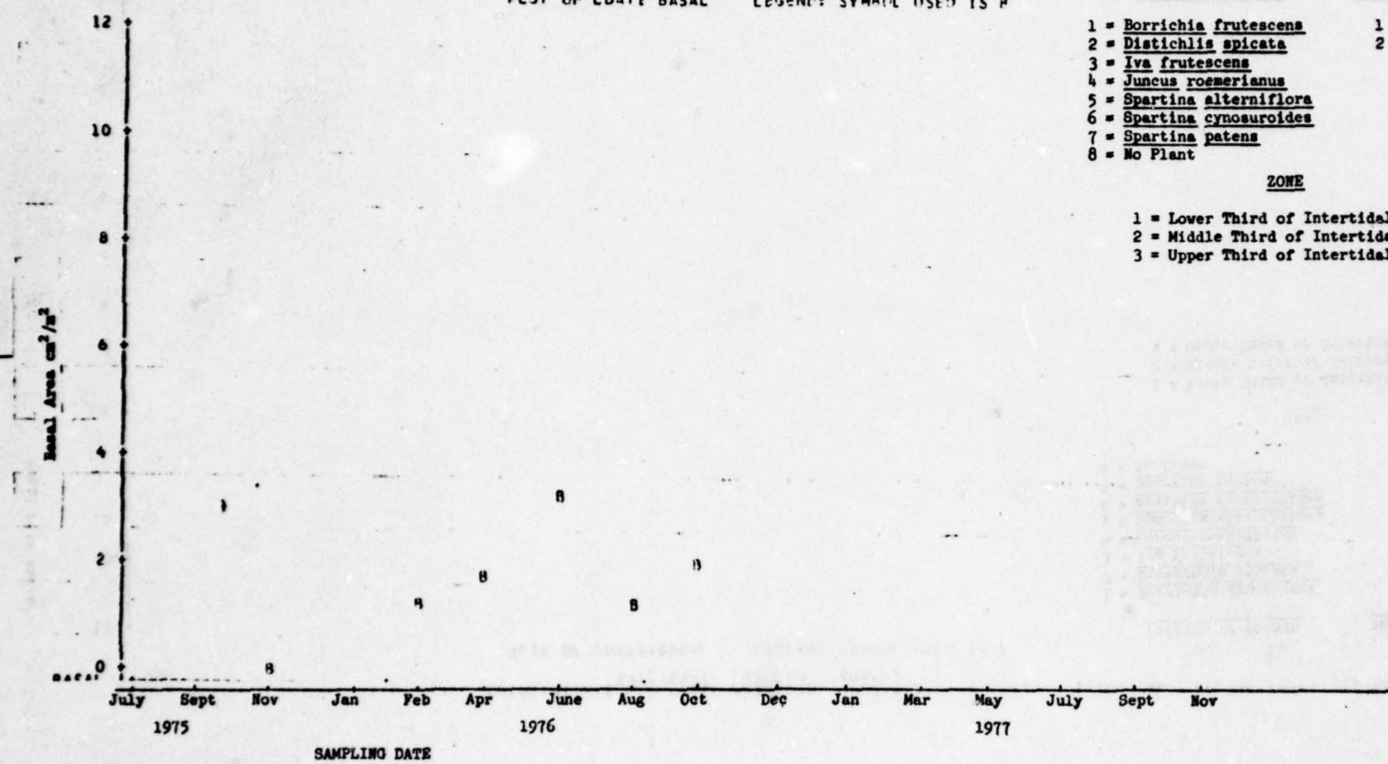
1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 1:19 THURSDAY, DECEMBER 22, 1977 127
SPECIES=2 PROP=1 ZONE=2

PLOT OF CDATE*BASAL LEGEND: SYMBOL USED IS B



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

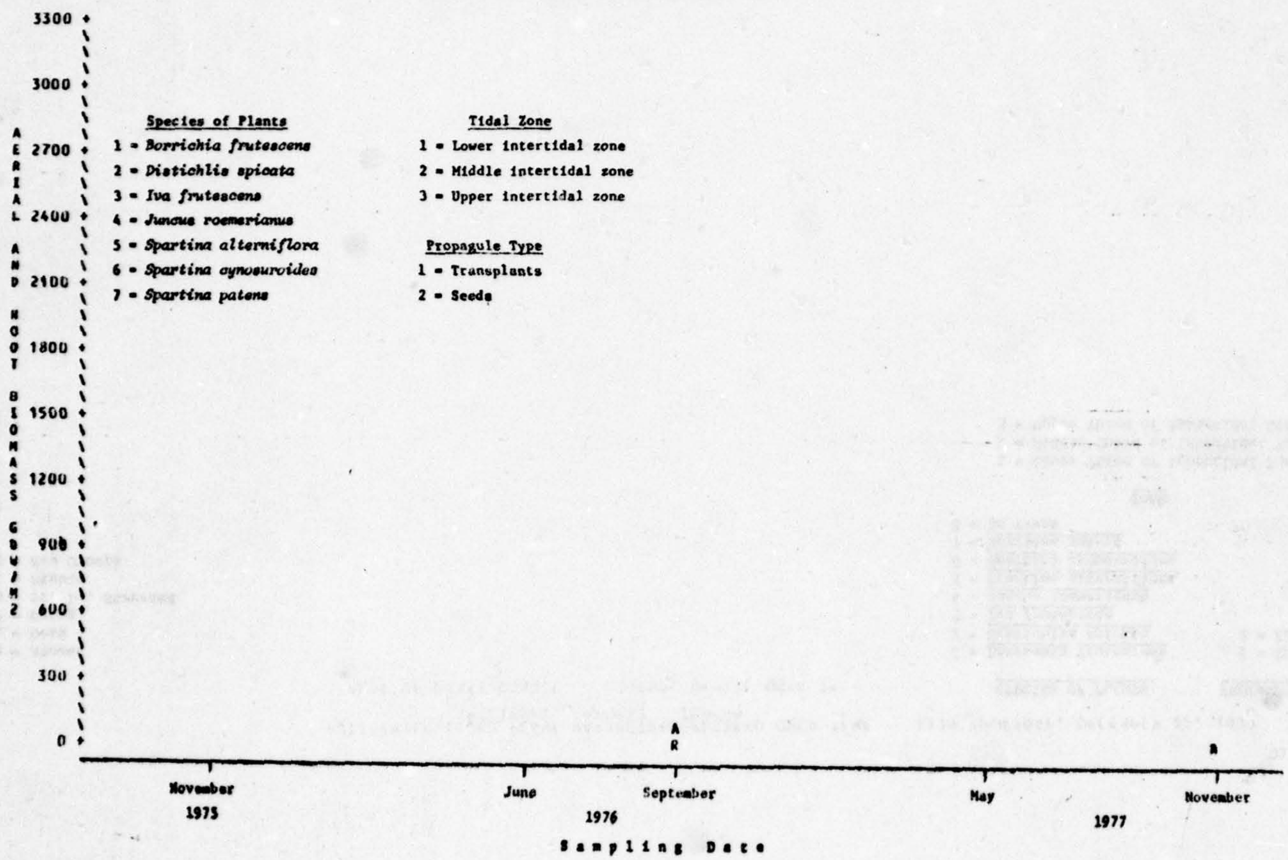
D30

BUTTERMILK SOUND ROOT AND AERIAL BIOMASS BY SAMPLING DATE

17:55 THURSDAY, APRIL 13, 1978

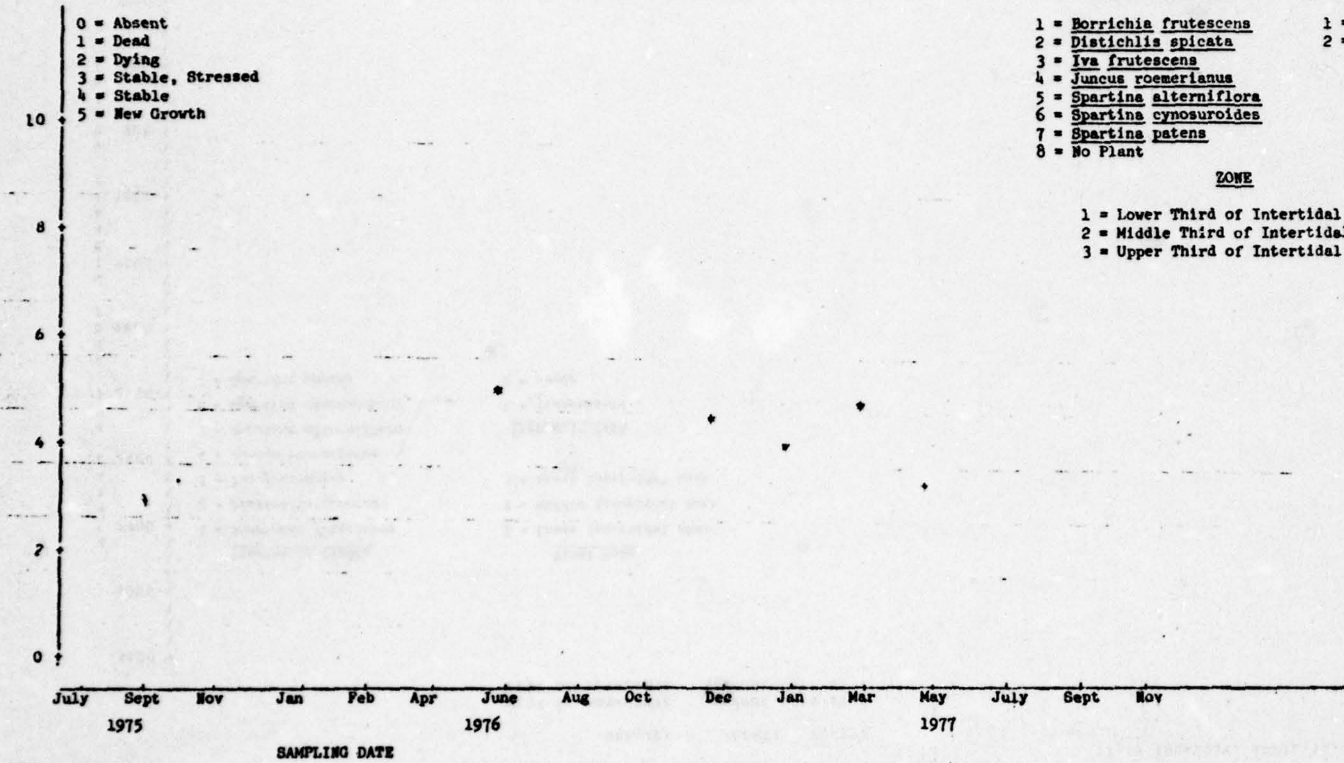
SPECIES=2 PROP=1 ZONE=2

PLOT OF MOM*CDATE SYMBOL USED IS R
PLOT OF AER*CDATE SYMBOL USED IS A



BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 1:19 THURSDAY, DECEMBER 22, 1977 10
SPECIES=1 PROP=2 ZONE=3

PLOT OF CDATE*CONDIT LEGEND: SYMBOL USED IS *



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

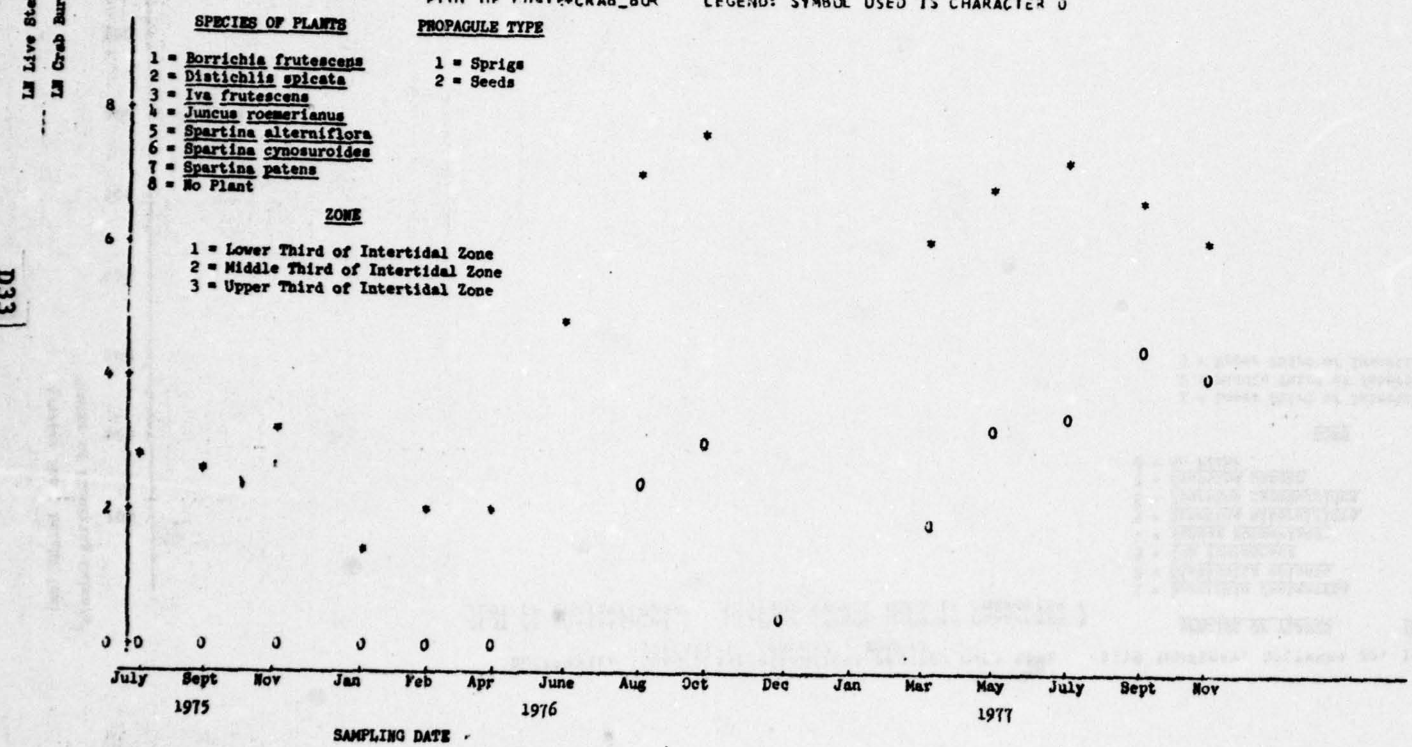
D32

NATURAL LOGARITHMIC PLOT IF CULM DENSITY AND CRAB BURROWS DENSITY WITH TIME

23:36 WEDNESDAY, DECEMBER 21, 1977 13

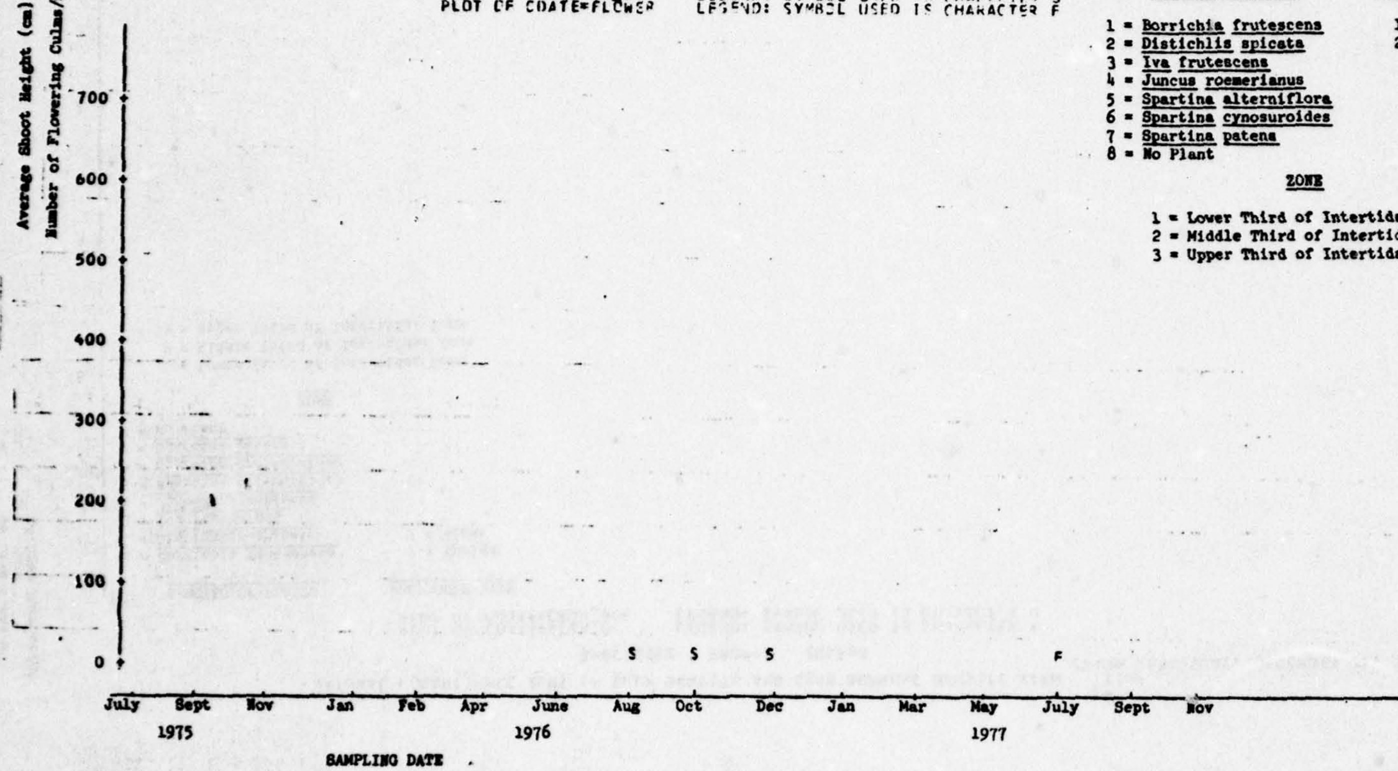
SPECIES=2 PROP=1 ZONE=3

PLOT OF CDATE*STEM_D LEGEND: SYMBOL USED IS CHARACTER *
PLOT OF CDATE*CRAB_BUR LEGEND: SYMBOL USED IS CHARACTER 0



BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 1:19 THURSDAY, DECEMBER 22, 1977 39
SPECIES=1 PROP=2 ZONE=3

PLOT OF CDATE*SH_HT LEGEND: SYMBOL USED IS CHARACTER S
PLOT OF CDATE*FLOWER LEGEND: SYMBOL USED IS CHARACTER F



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

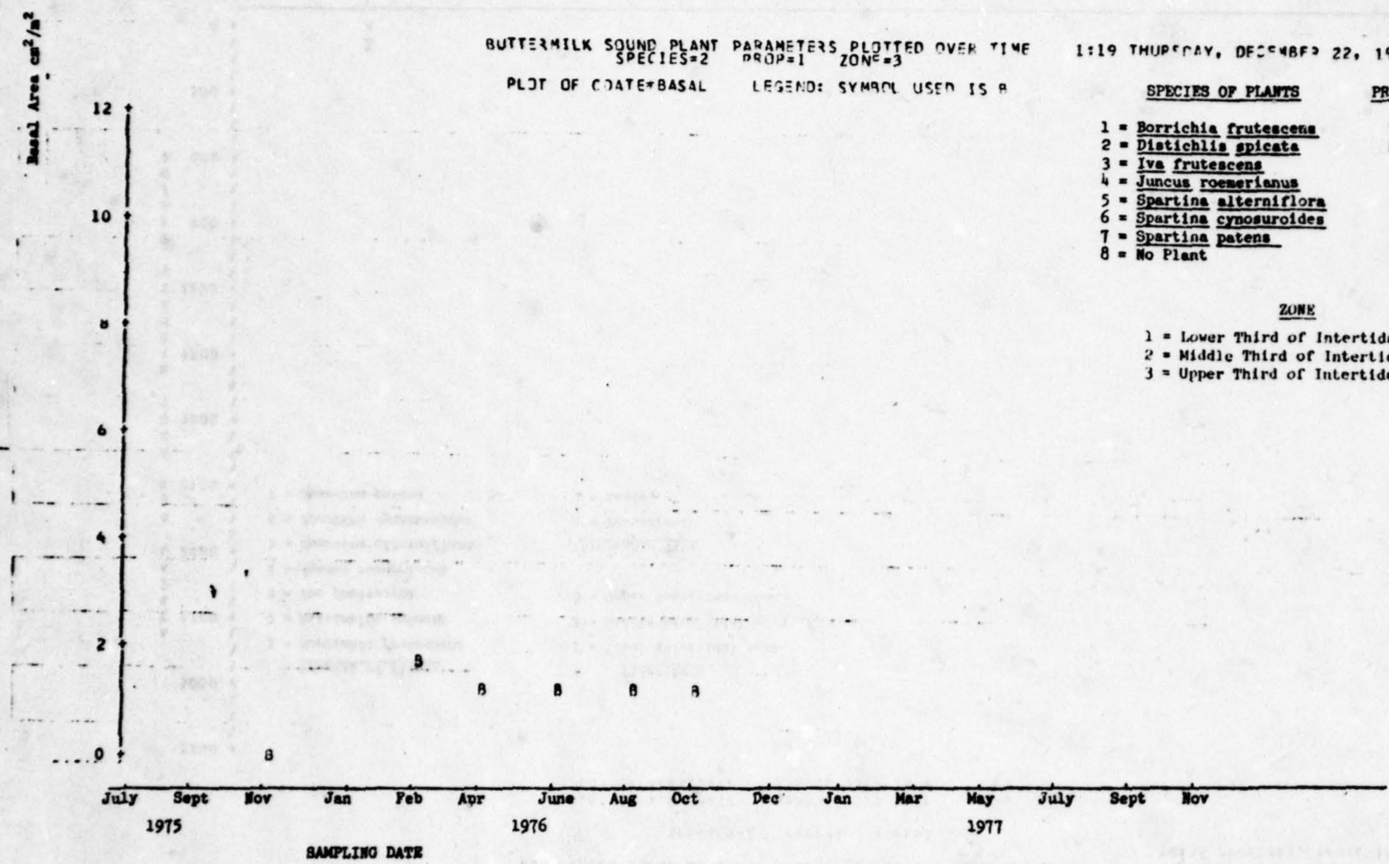
1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977 128
SPECIES=2   PROP=1   ZONE=3

PLOT OF CDATE*BASAL   LEGEND: SYMBOL USED IS 8



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

ZONE

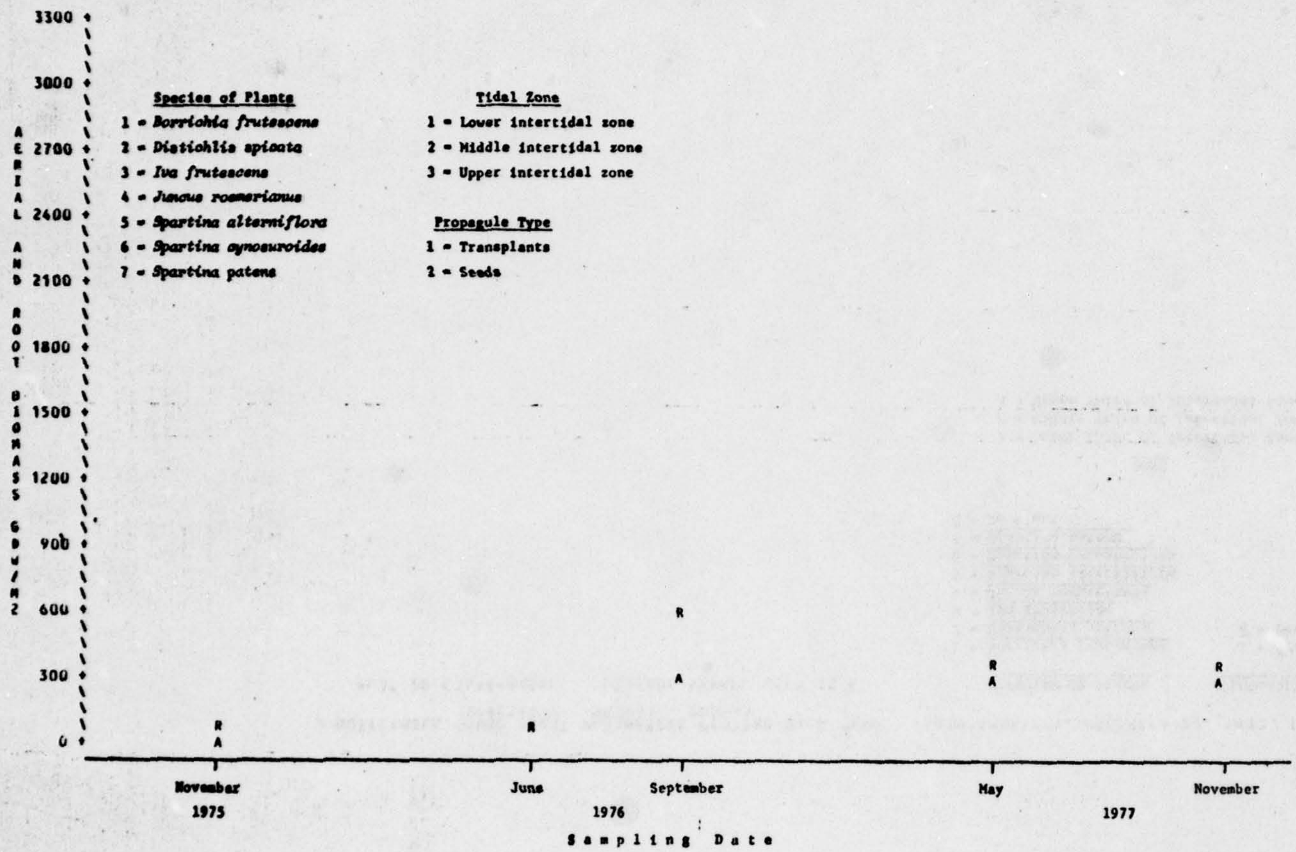
1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

BUTTERMILK SOUND ROOT AND AERIAL BIOMASS BY SAMPLING DATE

17:35 THURSDAY, APRIL 13, 1978

SPECIES=2 PROP=1 ZONE=3

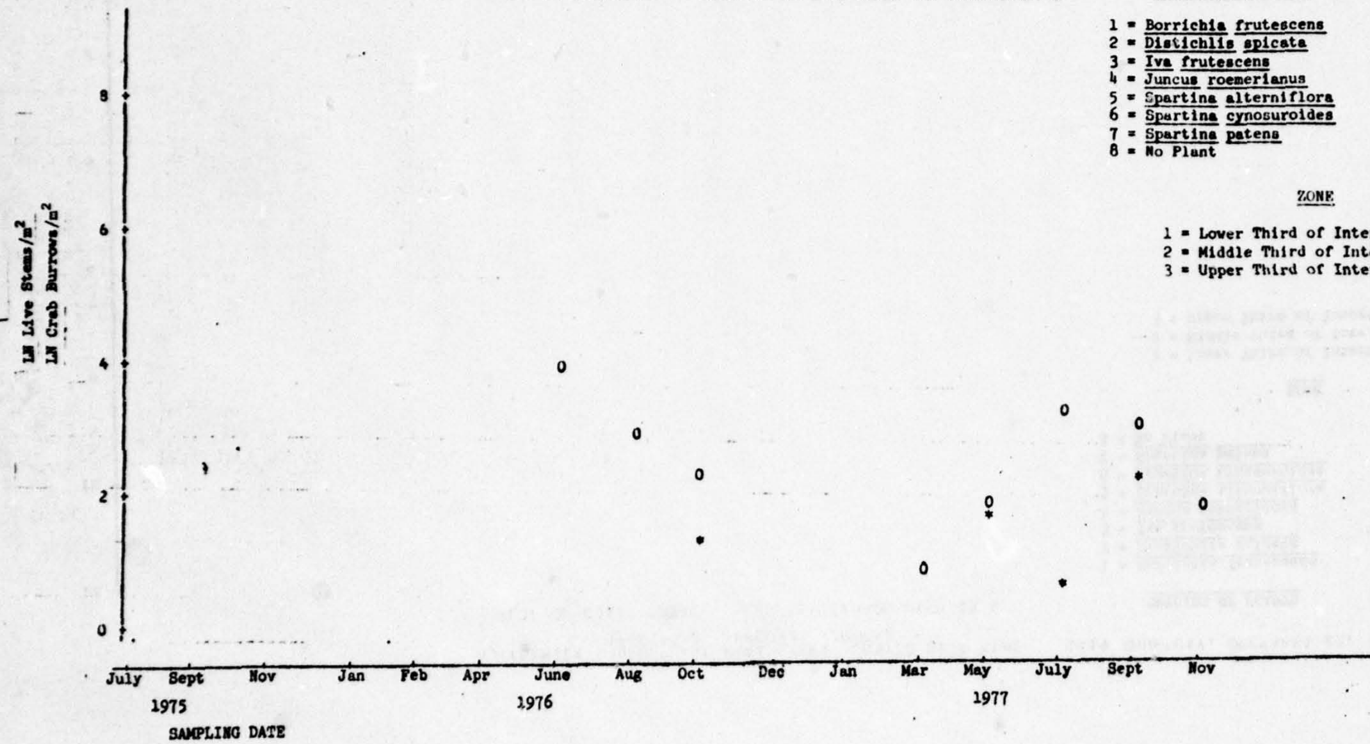
PLOT OF MOM*CDATE SYMBOL USED IS R
PLOT OF AER*CDATE SYMBOL USED IS A



NATURAL LOGARITHMIC PLOT IF CULM DENSITY AND CRAB BURROWS DENSITY WITH TIME

SPECIES=2 PROP=2 ZONE=2

PLOT OF CDATE*STEM_D LEGEND: SYMBOL USED IS CHARACTER *
PLOT OF CDATE*CRAB_BUR LEGEND: SYMBOL USED IS CHARACTER 0



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

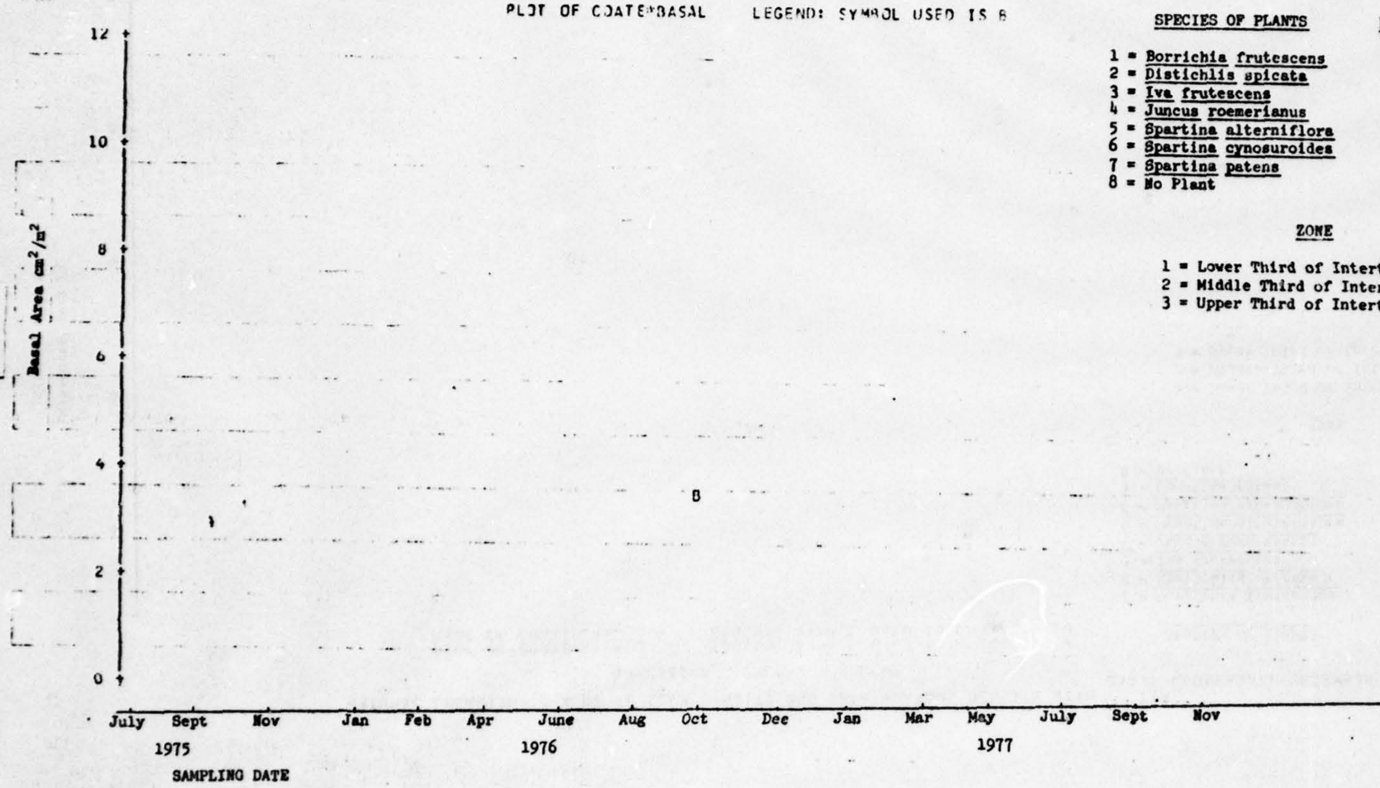
ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME
SPECIES=2 PROP=2 ZONE=2

1:19 THURSDAY, DECEMBER 22, 1977 129

PLOT OF CDATE*BASAL LEGEND: SYMBOL USED IS B



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

ZONE

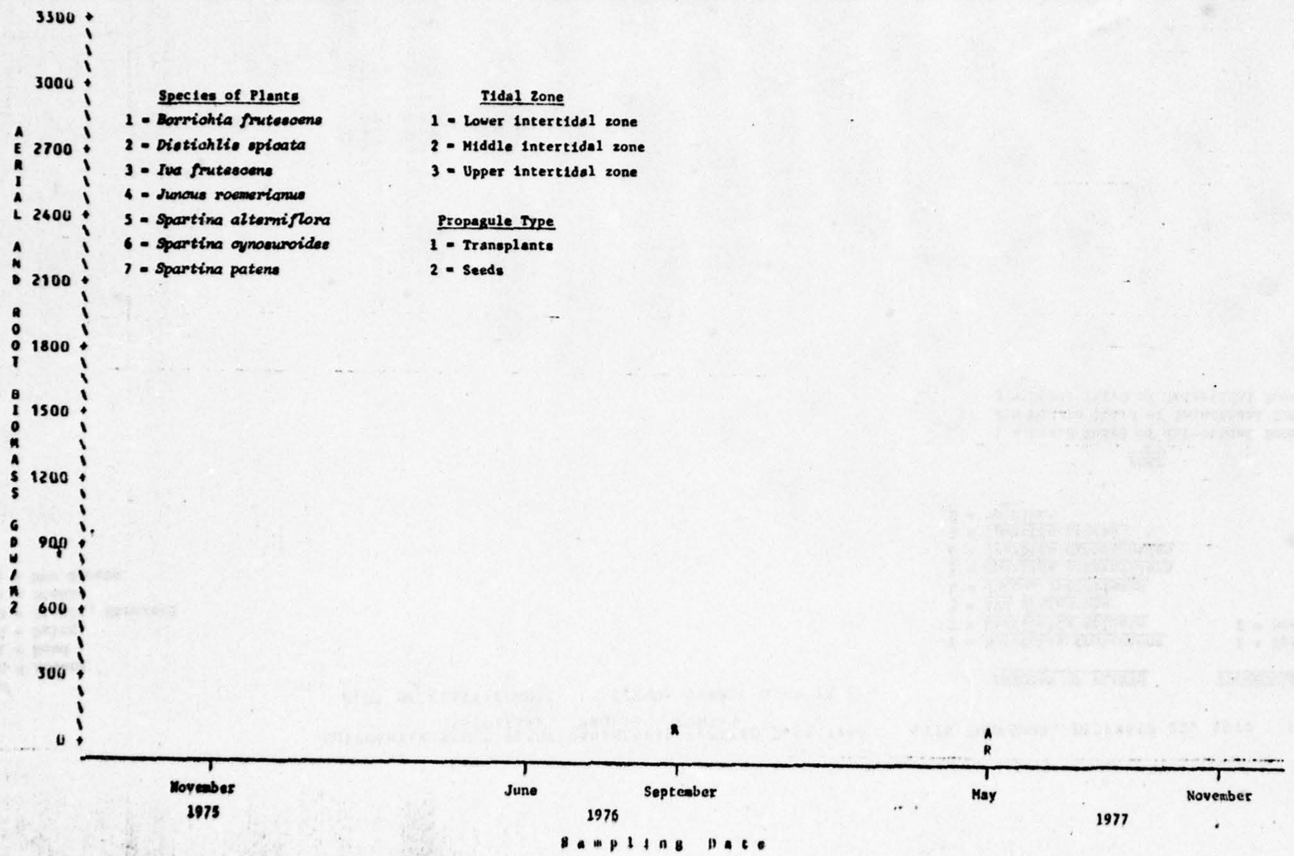
1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

D38

BUTTERMILK SOUND ROOT AND AERIAL BIOMASS BY SAMPLING DATE 17:35 THURSDAY, APRIL 13, 1978

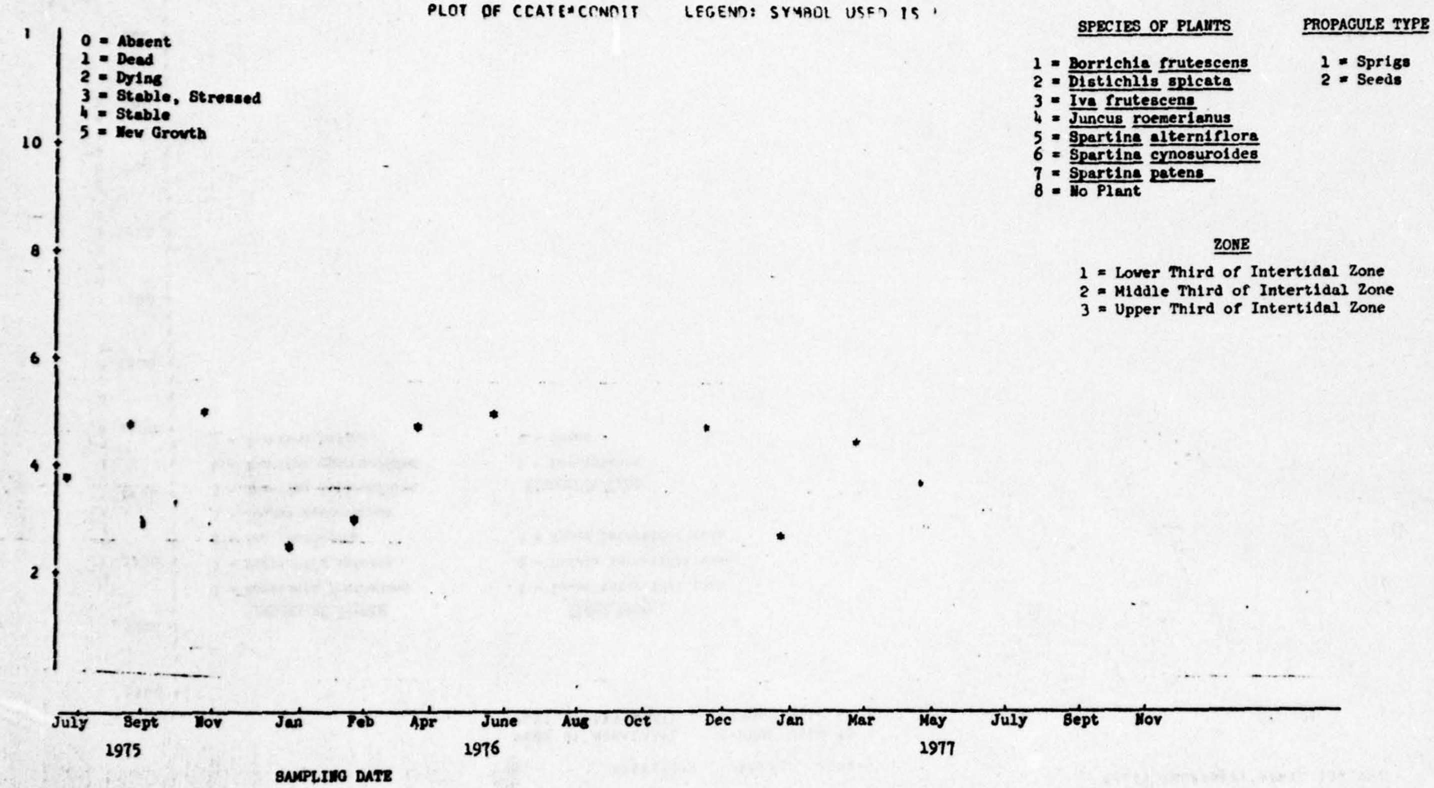
SPECIES=2 PROP=2 ZONE=2

PLOT OF MOM*CDATE SYMBOL USED IS R
PLOT OF AER*CDATE SYMBOL USED IS A



BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977   12
SPECIES=2   PROP=1   ZONE=3

PLOT OF CDATE*CONDIT   LEGEND: SYMBOL USED IS *



D40

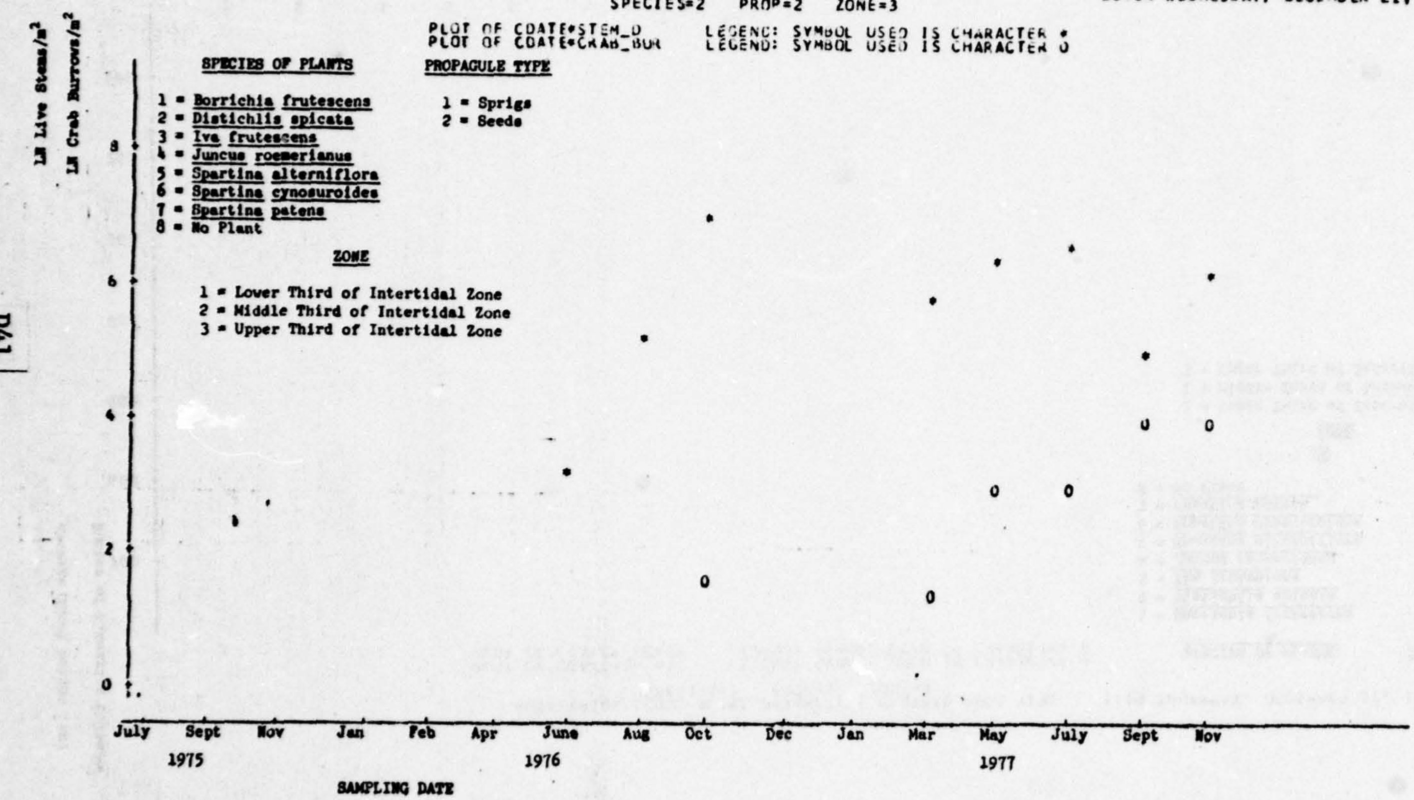
NATURAL LOGARITHMIC PLOT IF CULM DENSITY AND CRAB BURROWS DENSITY WITH TIME

23:36 WEDNESDAY, DECEMBER 21, 1977 15

SPECIES=2 PROP=2 ZONE=3

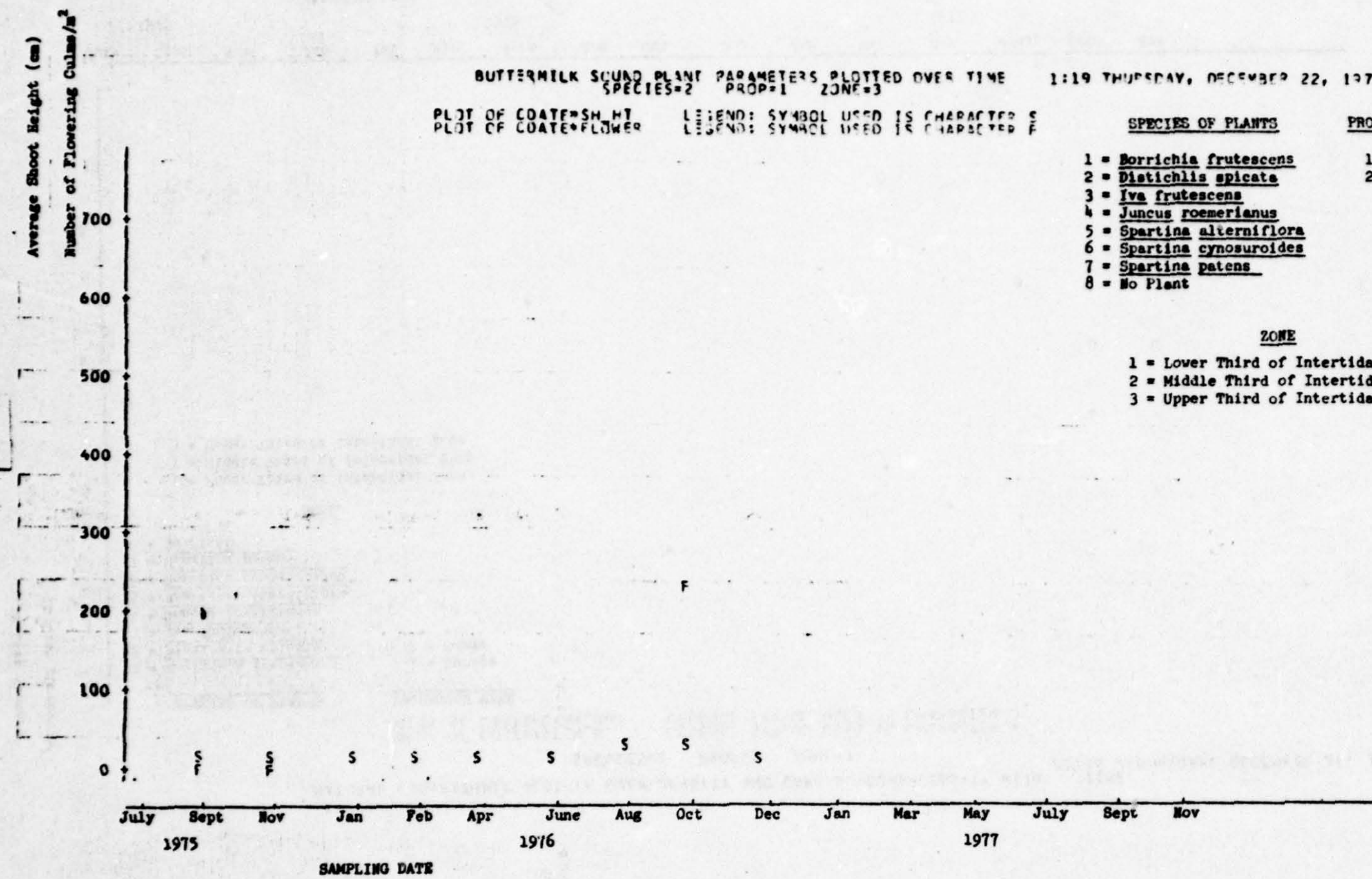
PLOT OF CDATE*STEM_D LEGEND: SYMBOL USED IS CHARACTER *

PLOT OF CDATE*CRAB_BUR LEGEND: SYMBOL USED IS CHARACTER O



BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977   41
SPECIES=2   PROP=1   ZONE=3

PLOT OF CDATE*SH_HT   LEGEND: SYMBOL USED IS CHARACTER S
PLOT OF CDATE*FLOWER   LEGEND: SYMBOL USED IS CHARACTER F



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

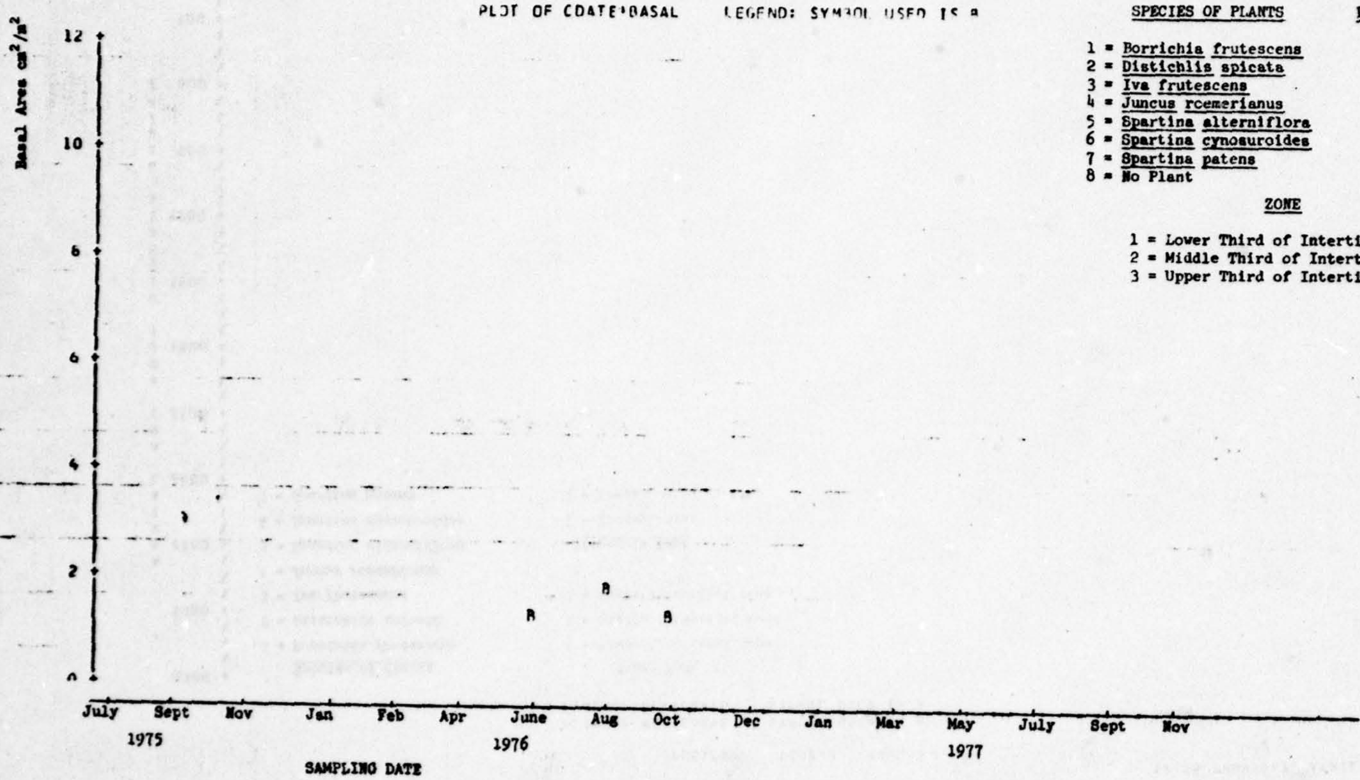
ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

D42

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 1:19 THURSDAY, DECEMBER 22, 1977 130
SPECIES=2 PROP=2 ZONE=3

PLOT OF CDATE*BASAL LEGEND: SYMBOL USED IS 8



SPECIES OF PLANTS

1 = Borrichia frutescens
2 = Distichlis spicata
3 = Iva frutescens
4 = Juncus roemerianus
5 = Spartina alterniflora
6 = Spartina cynosuroides
7 = Spartina patens
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

ZONE

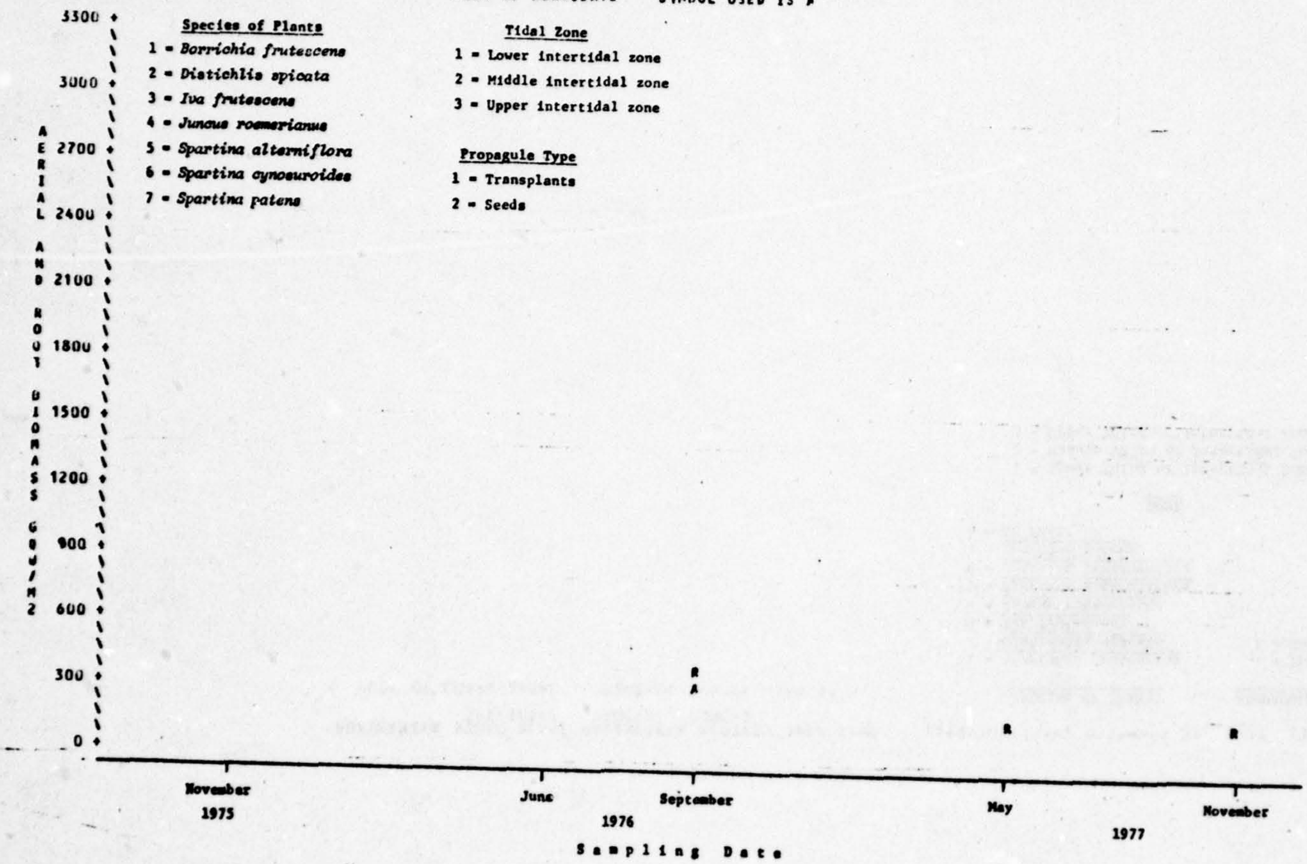
1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

D43

BUTTERMILK SOUND ROOT AND AERIAL BIOMASS BY SAMPLING DATE

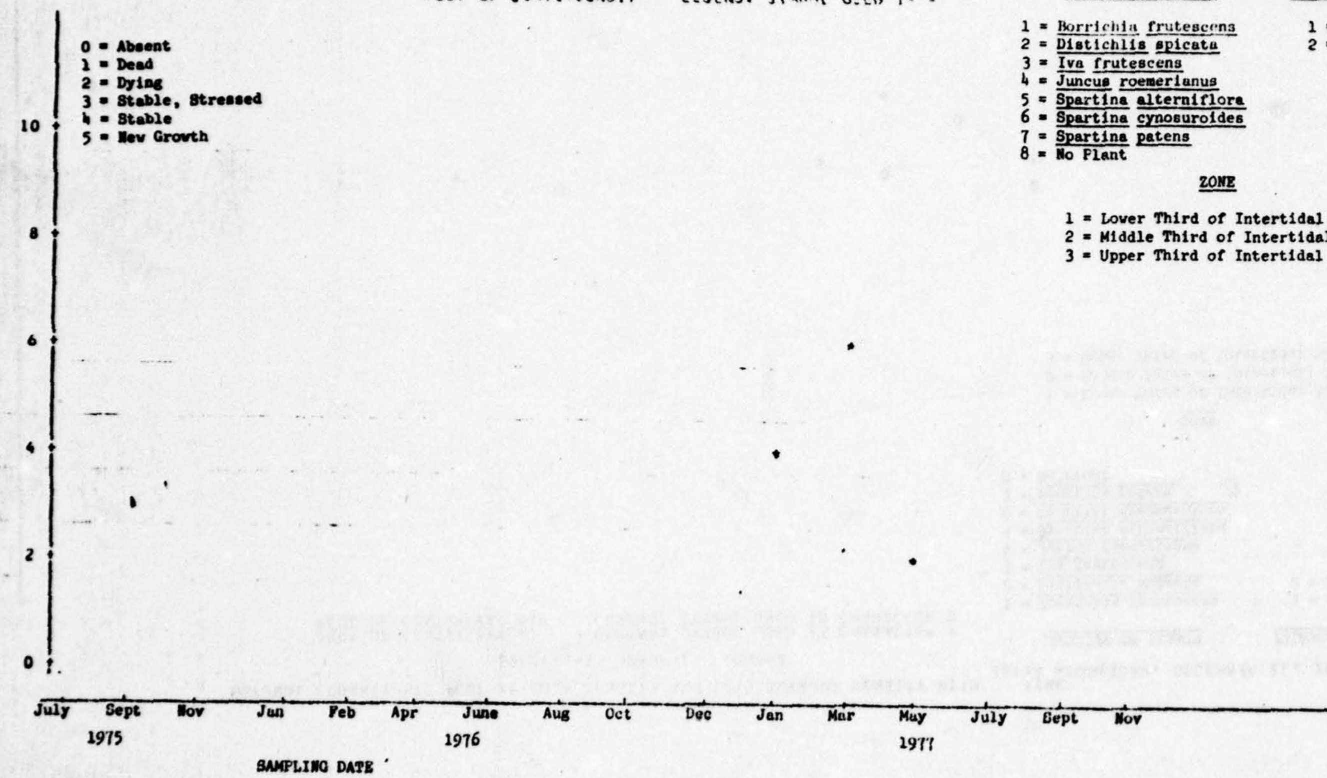
SPECIES=2 PROP=2 ZONE=3

PLOT OF ROM*CDATE SYMBOL USED IS R
PLOT OF AER*CDATE SYMBOL USED IS A



BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 1:19 THURSDAY, DECEMBER 22, 1977 13
SPECIES=2 PROP=2 ZONE=2

PLOT OF CDATE*CONDIT LEGEND: SYMBOL USED IS .



SPECIES OF PLANTS

1 = Borrichia frutescens
2 = Distichlis spicata
3 = Iva frutescens
4 = Juncus roemerianus
5 = Spartina alterniflora
6 = Spartina cynosuroides
7 = Spartina patens
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

D45

NATURAL LOGARITHMIC PLOT IF CULM DENSITY AND CRAB BURROWS DENSITY WITH TIME

23:36 WEDNESDAY, DECEMBER 21, 1977

SPECIES=3 PROP=1 ZONE=2

PLOT OF CDATE*STEM_D LEGEND: SYMBOL USED IS CHARACTER *
PLOT OF CDATE*CRAB_BUR LEGEND: SYMBOL USED IS CHARACTER 0

SPECIES OF PLANTS

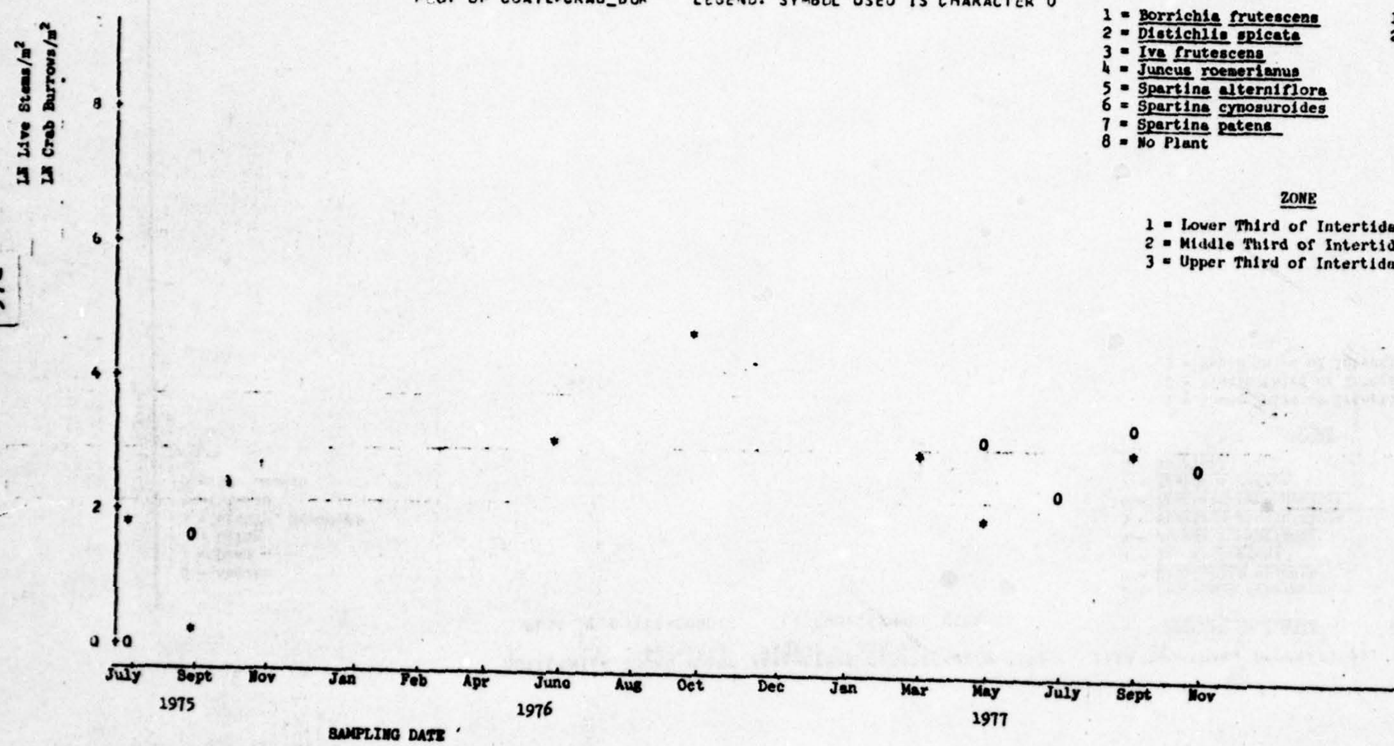
1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

ZONE

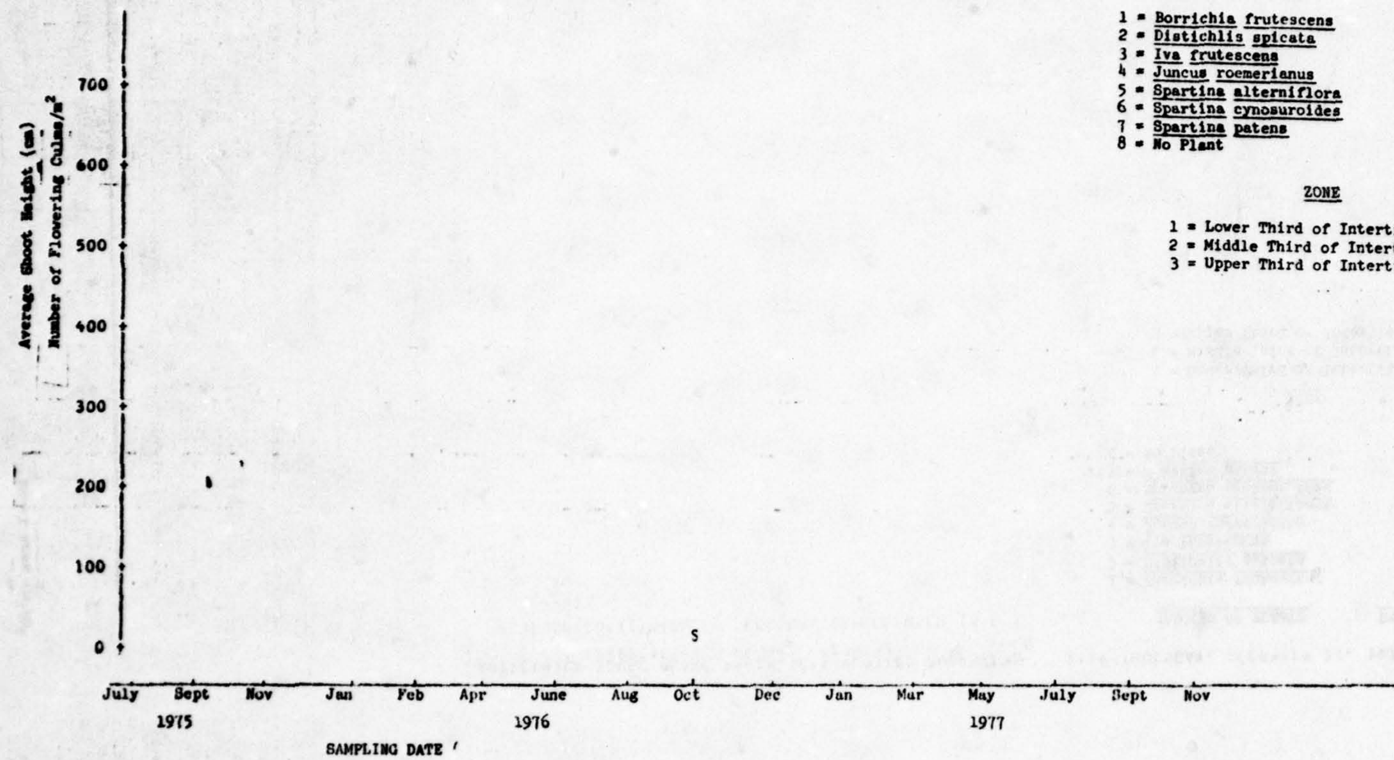
1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone



D46

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 1:19 THURSDAY, DECEMBER 22, 1977 42
SPECIES=2 PPOP=2 ZONE=2

PLOT OF CDATE*SH_HT LEGEND: SYMBOL USED IS CHARACTER S
PLOT OF CDATE*FLOWER LEGEND: SYMBOL USED IS CHARACTER F



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

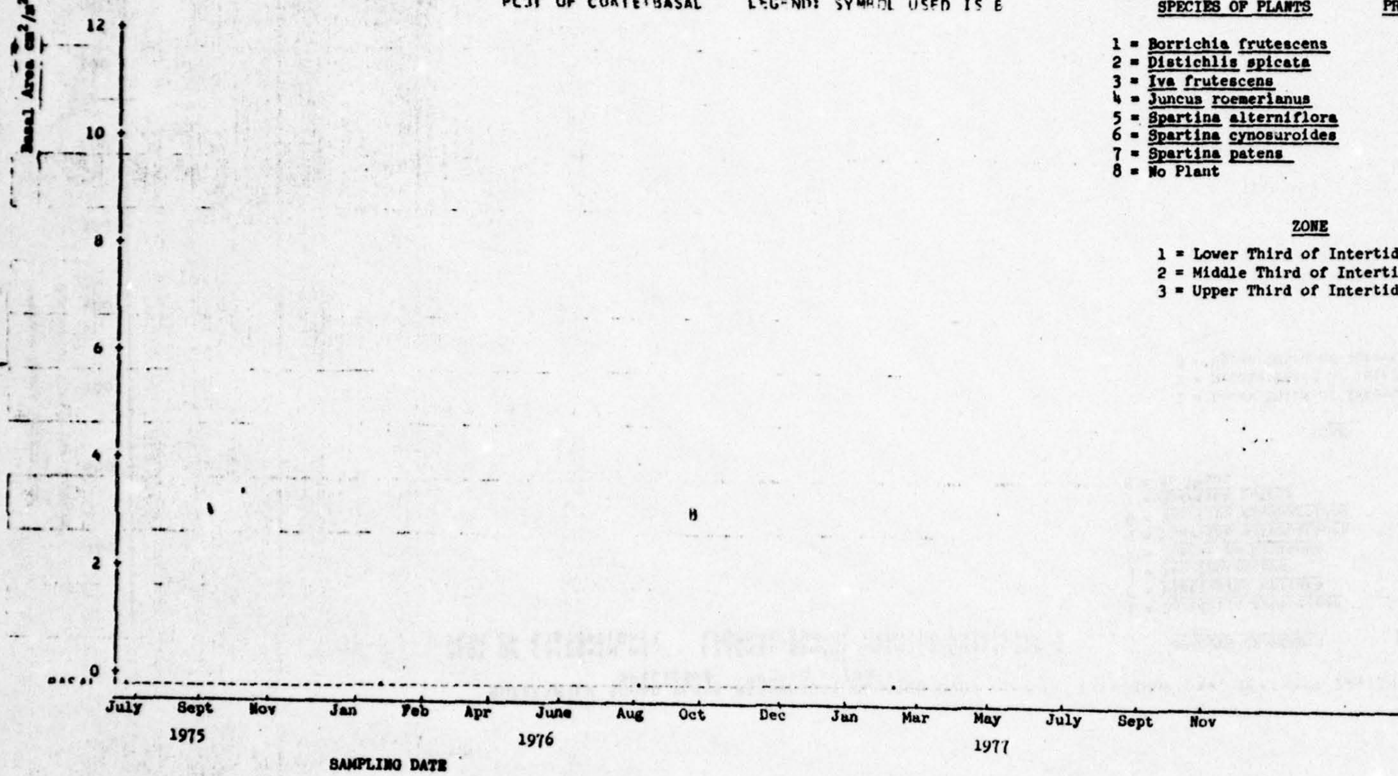
ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME
SPECIES=3 PROP=1 ZONE=2

1:19 THURSDAY, DECEMBER 22, 1977 131

PLOT OF COATE*BASAL LEGEND: SYMBOL USED IS B



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

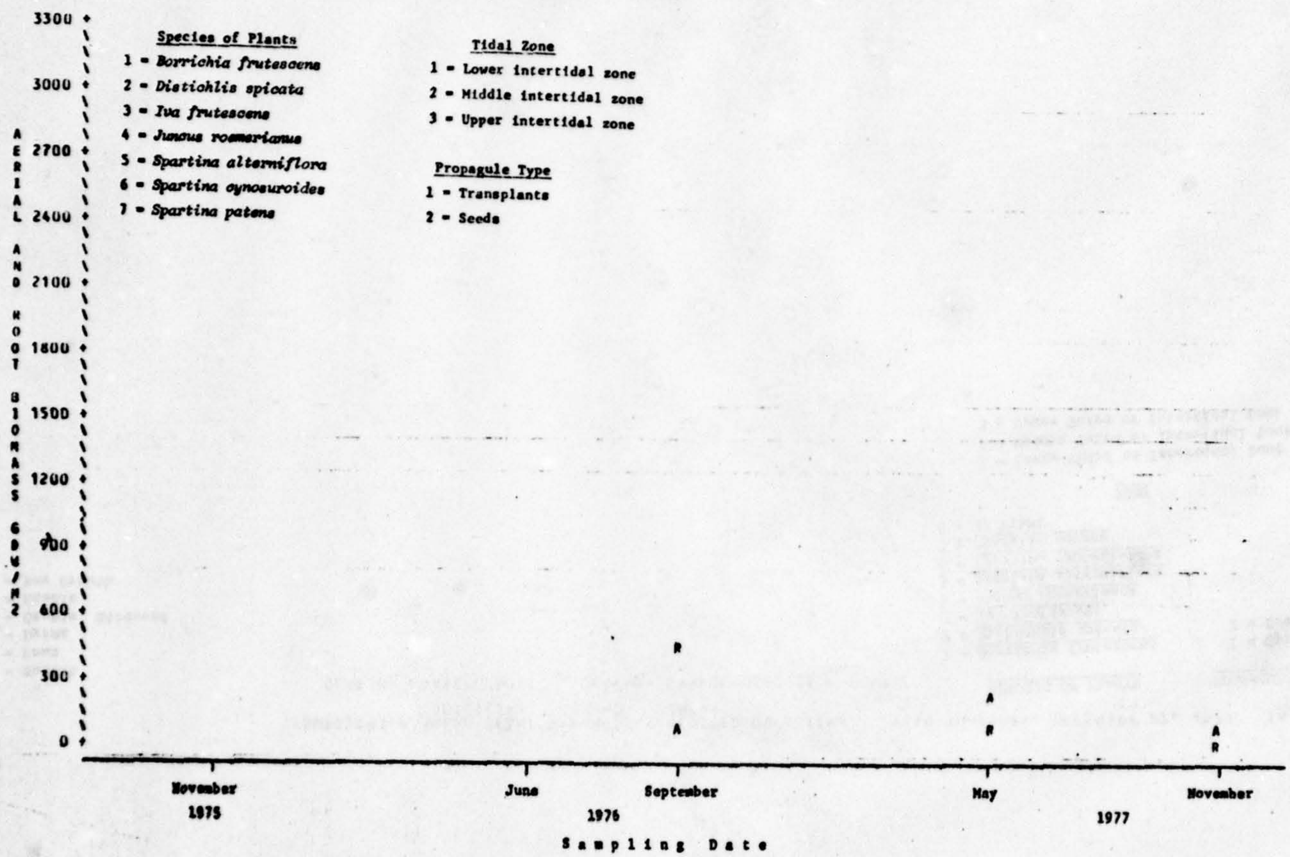
ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

BUTTERMILK SOUND ROOT AND AERIAL BIOMASS BY SAMPLING DATE

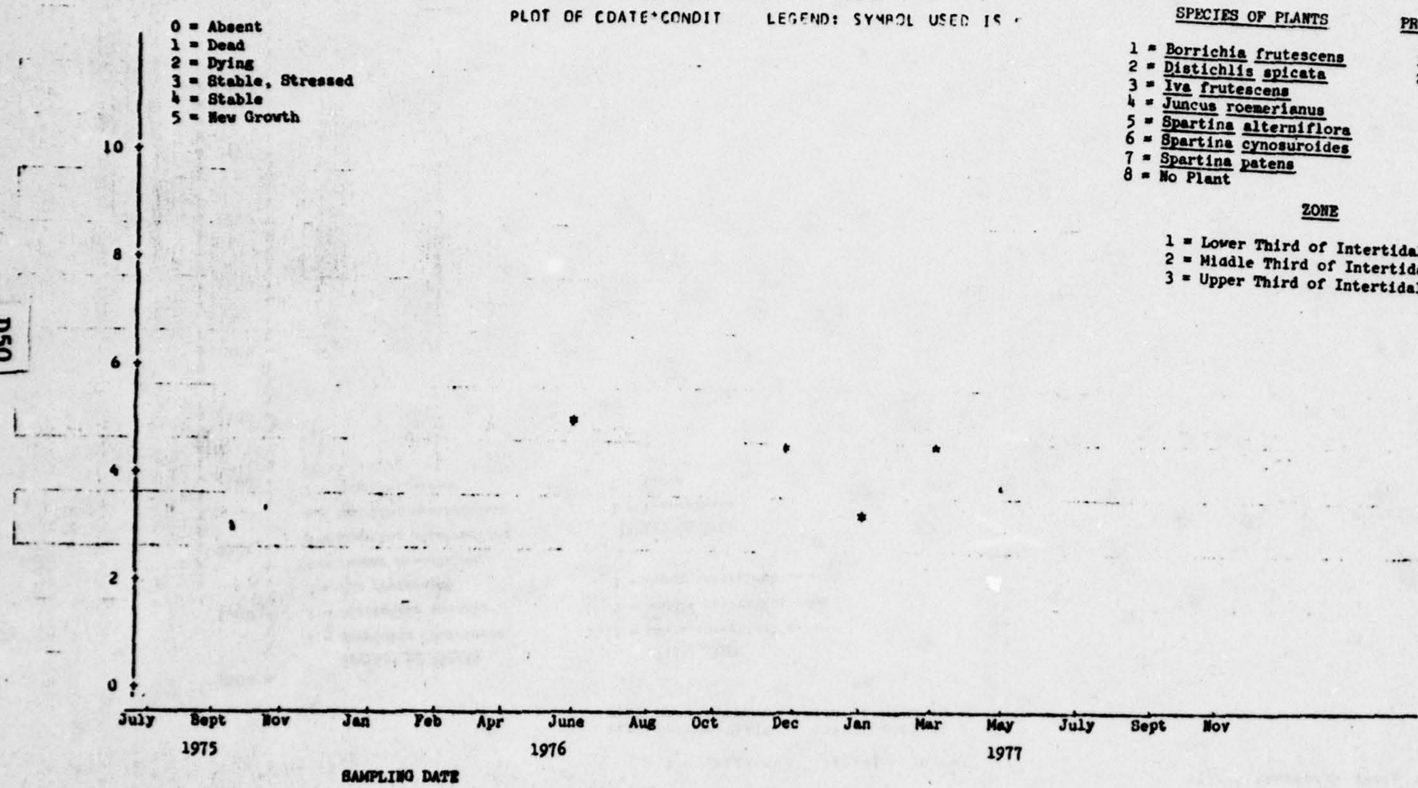
SPECIES=3 PROP=1 ZONE=2

PLOT OF MOM*CDATE SYMBOL USED IS R
PLOT OF AER*CDATE SYMBOL USED IS A



BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 1:19 THURSDAY, DECEMBER 22, 1977 14
SPECIES=2 PROP=2 ZONE=3

PLOT OF CDATE*CONDIT LEGEND: SYMBOL USED IS *



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

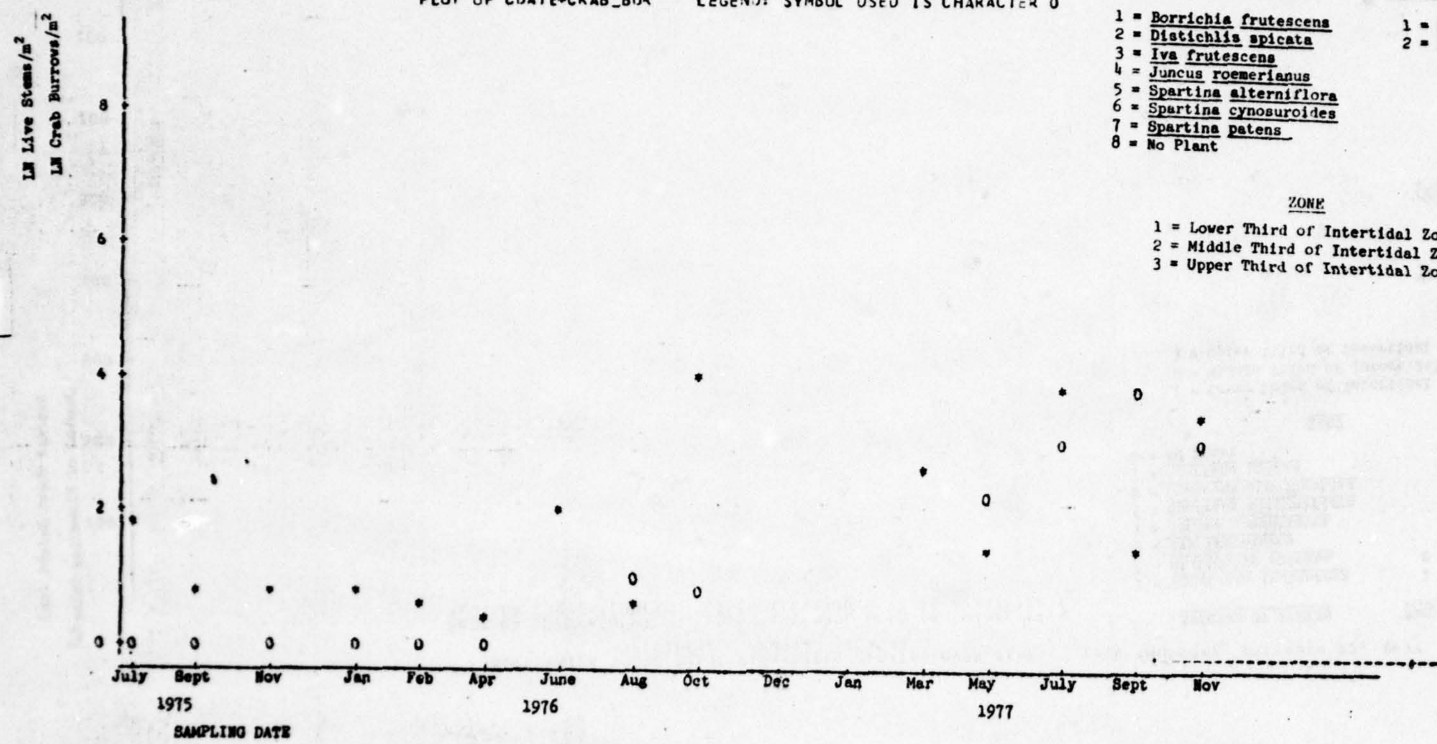
D50

NATURAL LOGARITHMIC PLOT IF CULM DENSITY AND CRAB BURROWS DENSITY WITH TIME

23:36 WEDNESDAY, DECEMBER 21, 1977 17

SPECIES=3 PROP=1 ZONE=3

PLOT OF CDATE*STEM_D LEGEND: SYMBOL USED IS CHARACTER *
PLOT OF CDATE*CRAB_BUR LEGEND: SYMBOL USED IS CHARACTER 0



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

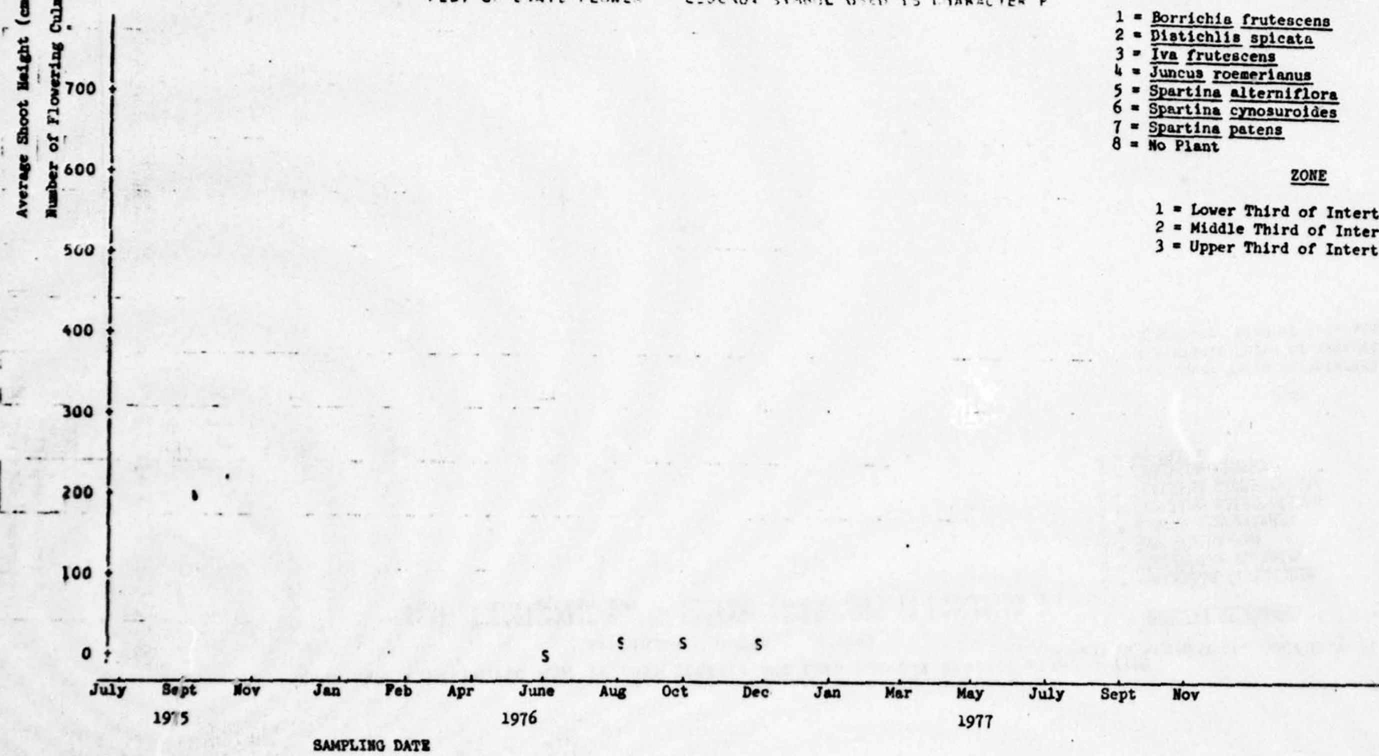
1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 1:19 THURSDAY, DECEMBER 22, 1977 43
SPECIES=2 PROP=2 ZONE=3

PLOT OF CDATE*SH_HT LEGEND: SYMBOL USED IS CHARACTER S
PLOT OF CDATE*FLOWER LEGEND: SYMBOL USED IS CHARACTER F



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

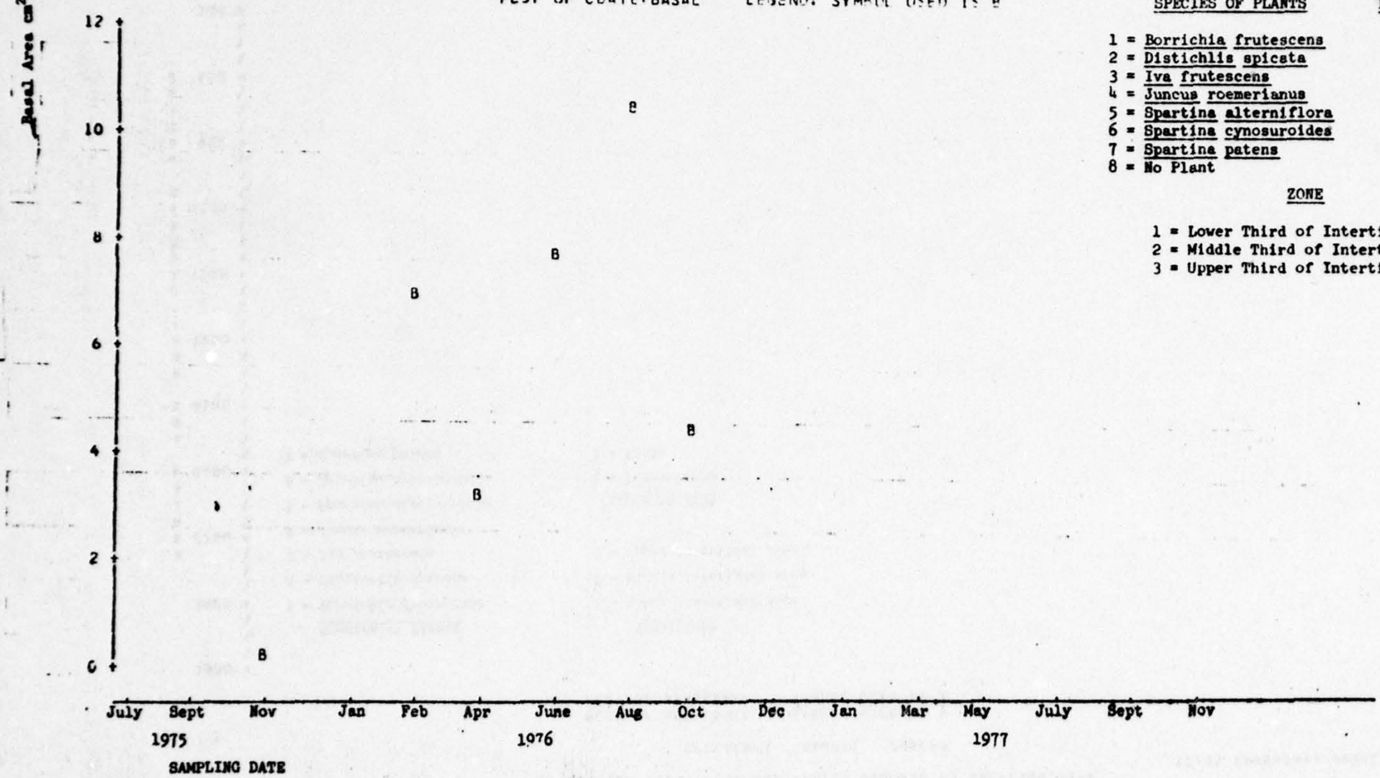
ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

D52

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977 132
SPECIES=3 PROP=1 ZONE=3

PLOT OF CDATE*BASAL   LEGEND: SYMBOL USED IS B



SPECIES OF PLANTS

1 = Borrichia frutescens
2 = Distichlis spicata
3 = Iva frutescens
4 = Juncus roemerianus
5 = Spartina alterniflora
6 = Spartina cynosuroides
7 = Spartina patens
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

ZONE

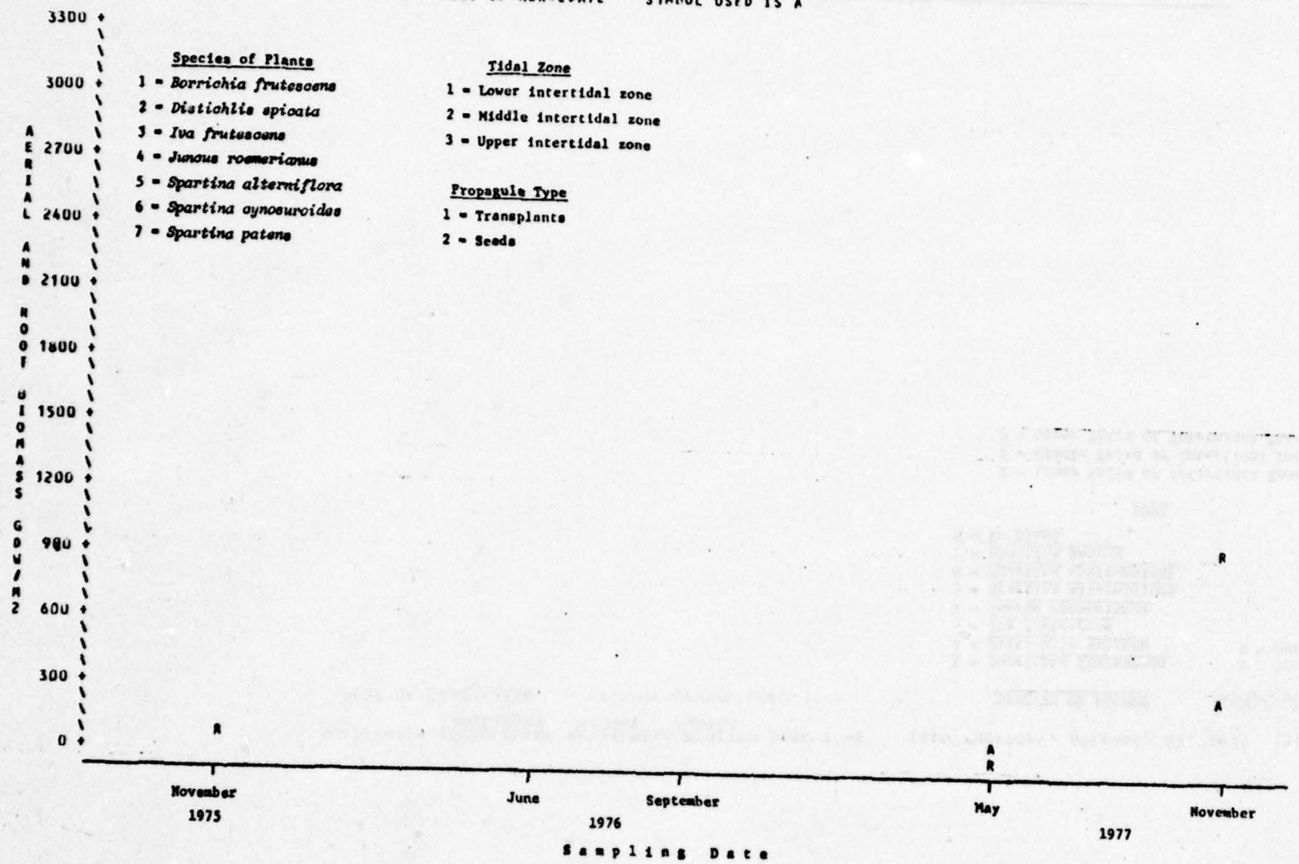
1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

D53

BUTTERMILK SOUND ROOT AND AERIAL BIOMASS BY SAMPLING DATE

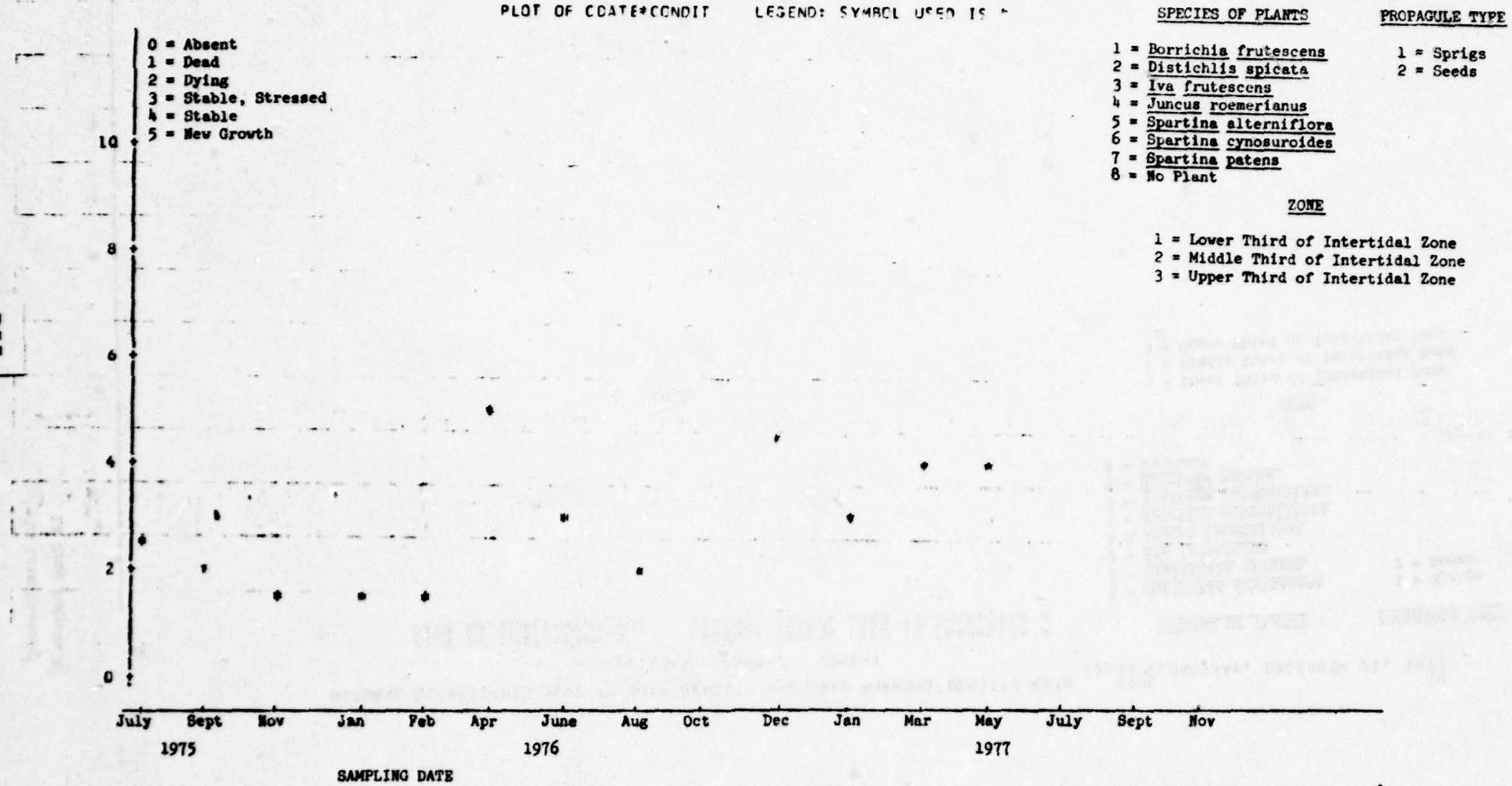
SPECIES=3 PROP=1 ZONE=3

PLOT OF MOM*CDATE SYMBOL USED IS R
PLOT OF AEM*CDATE SYMBOL USED IS A



BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 1:19 THURSDAY, DECEMBER 22, 1977 16
SPECIES=3 PROP=1 ZONE=3

PLOT OF CDATE*CONDIT LEGEND: SYMBOL USED IS *



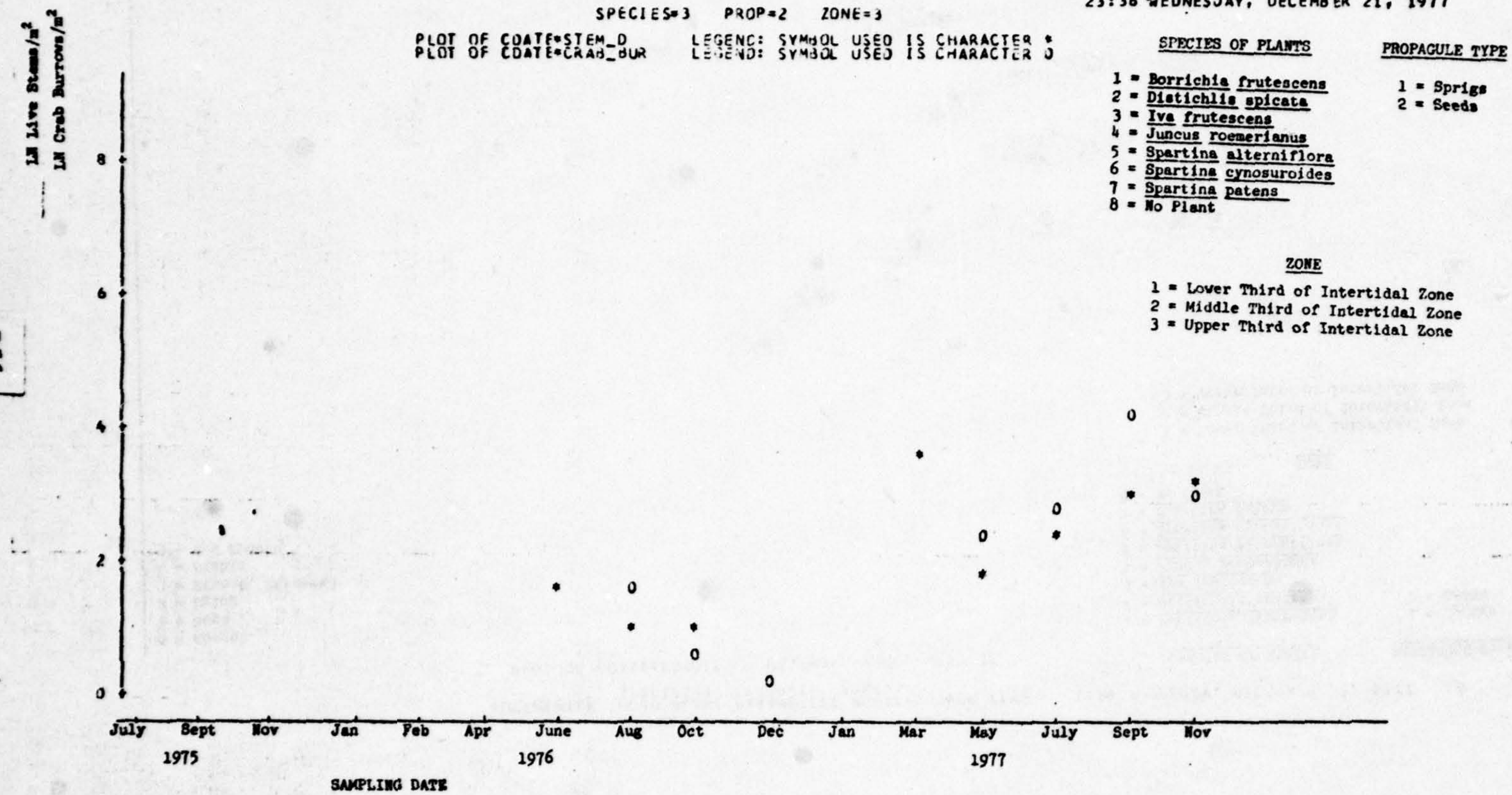
D55

NATURAL LOGARITHMIC PLOT IF CULM DENSITY AND CRAB BURROWS DENSITY WITH TIME

23:36 WEDNESDAY, DECEMBER 21, 1977 19

SPECIES=3 PROP=2 ZONE=3

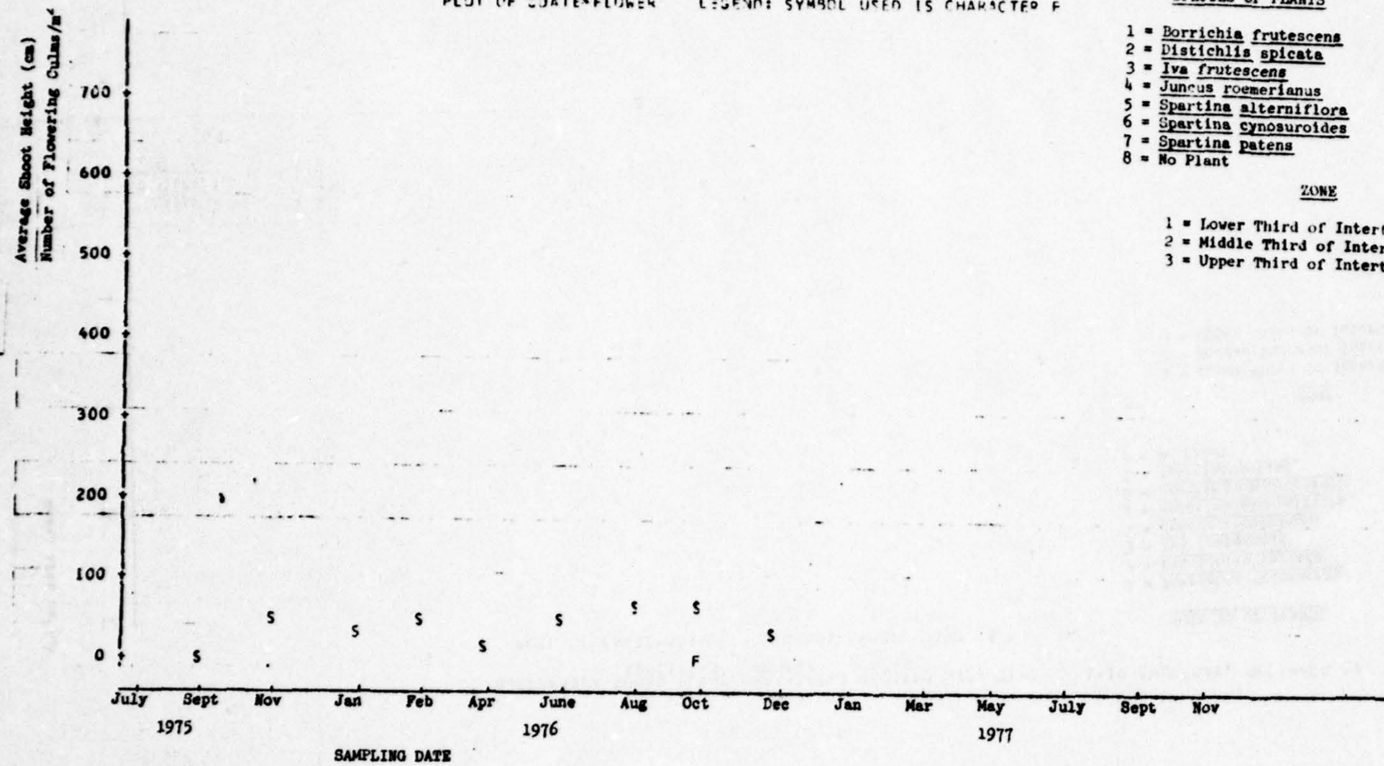
PLOT OF CDATE*STEM_D LEGEND: SYMBOL USED IS CHARACTER *
PLOT OF CDATE*CRAB_BUR LEGEND: SYMBOL USED IS CHARACTER 0



D56

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 1:19 THURSDAY, DECEMBER 22, 1977 45
SPECIES=3 PROP=1 ZONE=3

PLOT OF CDATE*SH_HT LEGEND: SYMBOL USED IS CHARACTER S
PLOT OF CDATE*FLOWER LEGEND: SYMBOL USED IS CHARACTER F



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

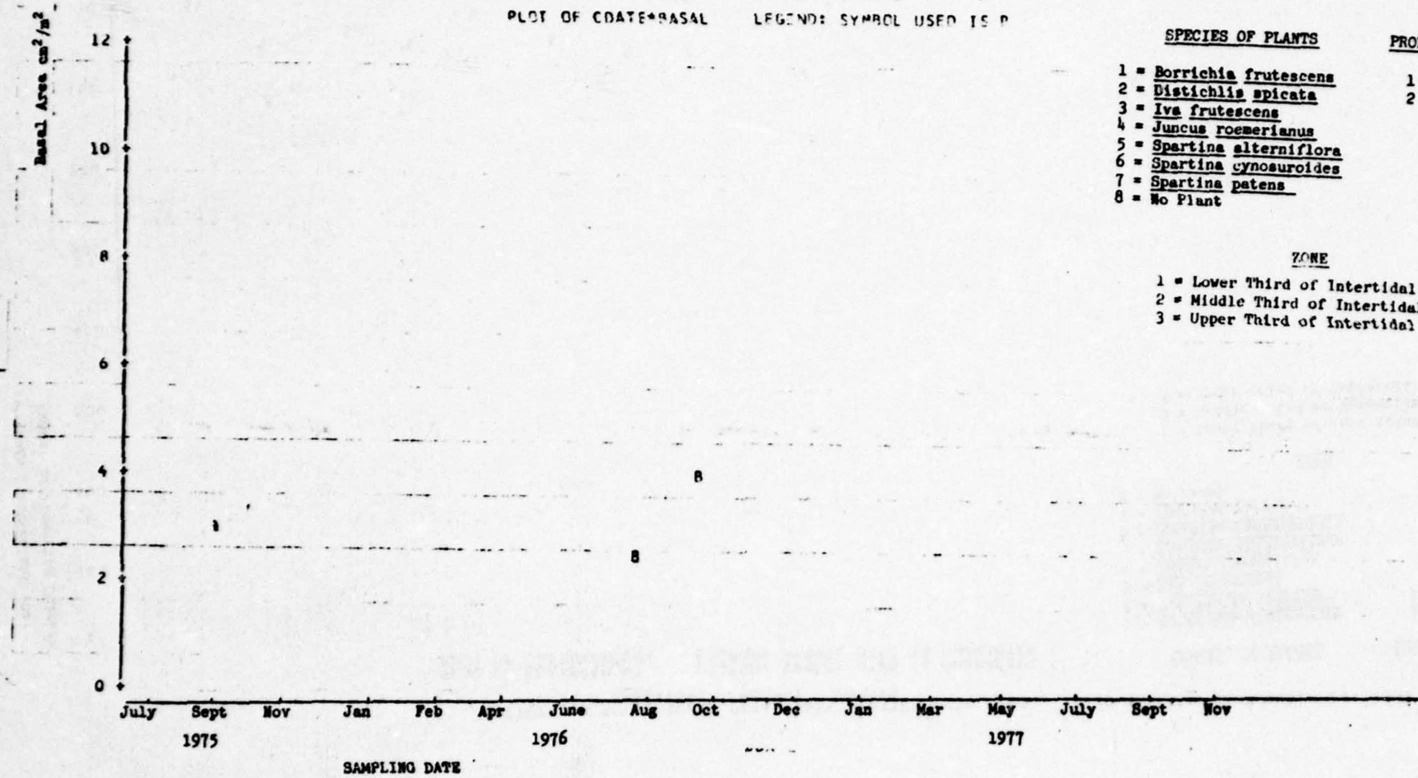
1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977 134
SPECIES=3   PROP=2   ZONE=3

PLOT OF CDATE*BASAL   LEGEND: SYMBOL USED IS P



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

ZONE

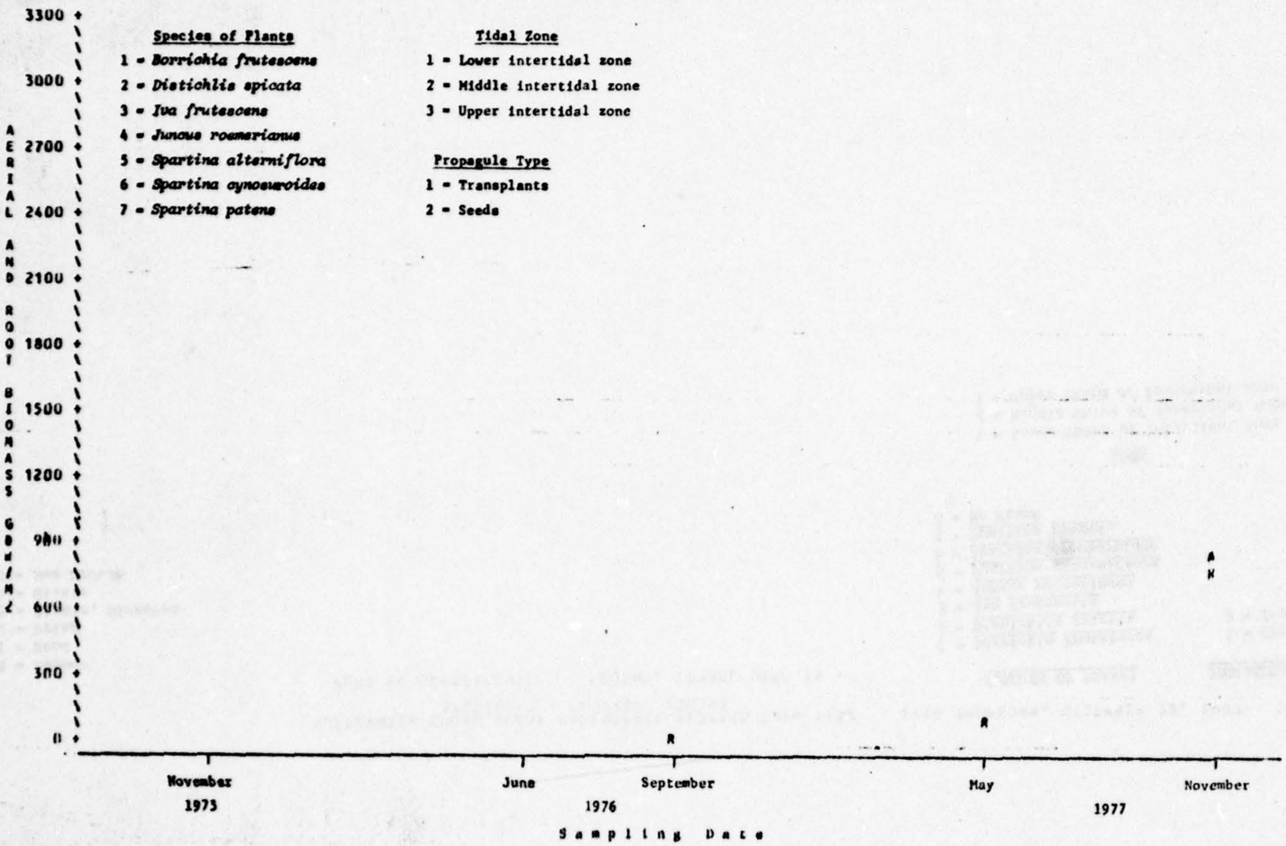
1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

D58

BUTTERMILK SOUND ROOT AND AERIAL BIOMASS BY SAMPLING DATE 17:35 THURSDAY, APRIL 13, 1978 13

SPECIES=3 PROP=2 ZONE=3

PLOT OF ROM*CDATE SYMBOL USED IS R
PLOT OF AER*CDATE SYMBOL USED IS A



BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977   15
SPECIES=3   PROP=1   ZONE=2

PLOT OF CDATE*CONDIT   LEGEND: SYMBOL USED IS *

0 = Absent
1 = Dead
2 = Dying
3 = Stable, Stressed
4 = Stable
5 = New Growth

SPECIES OF PLANTS

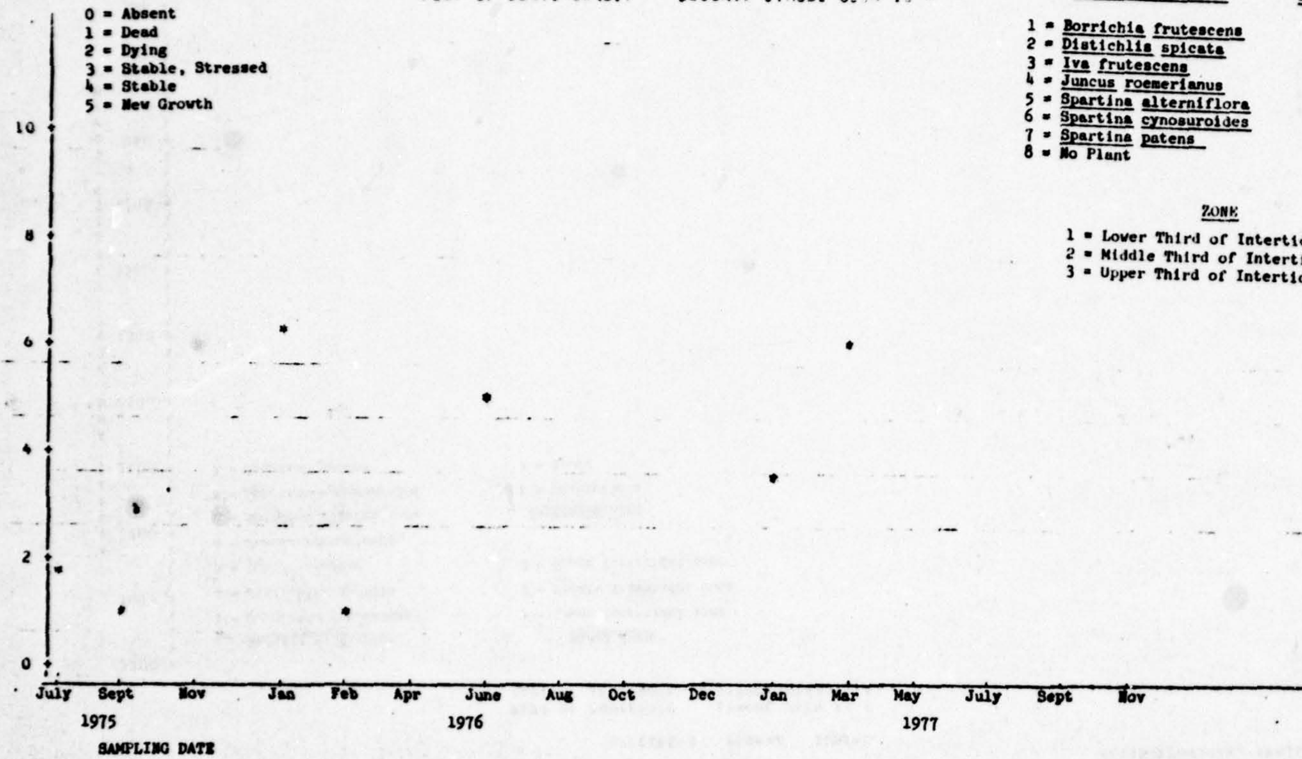
1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone



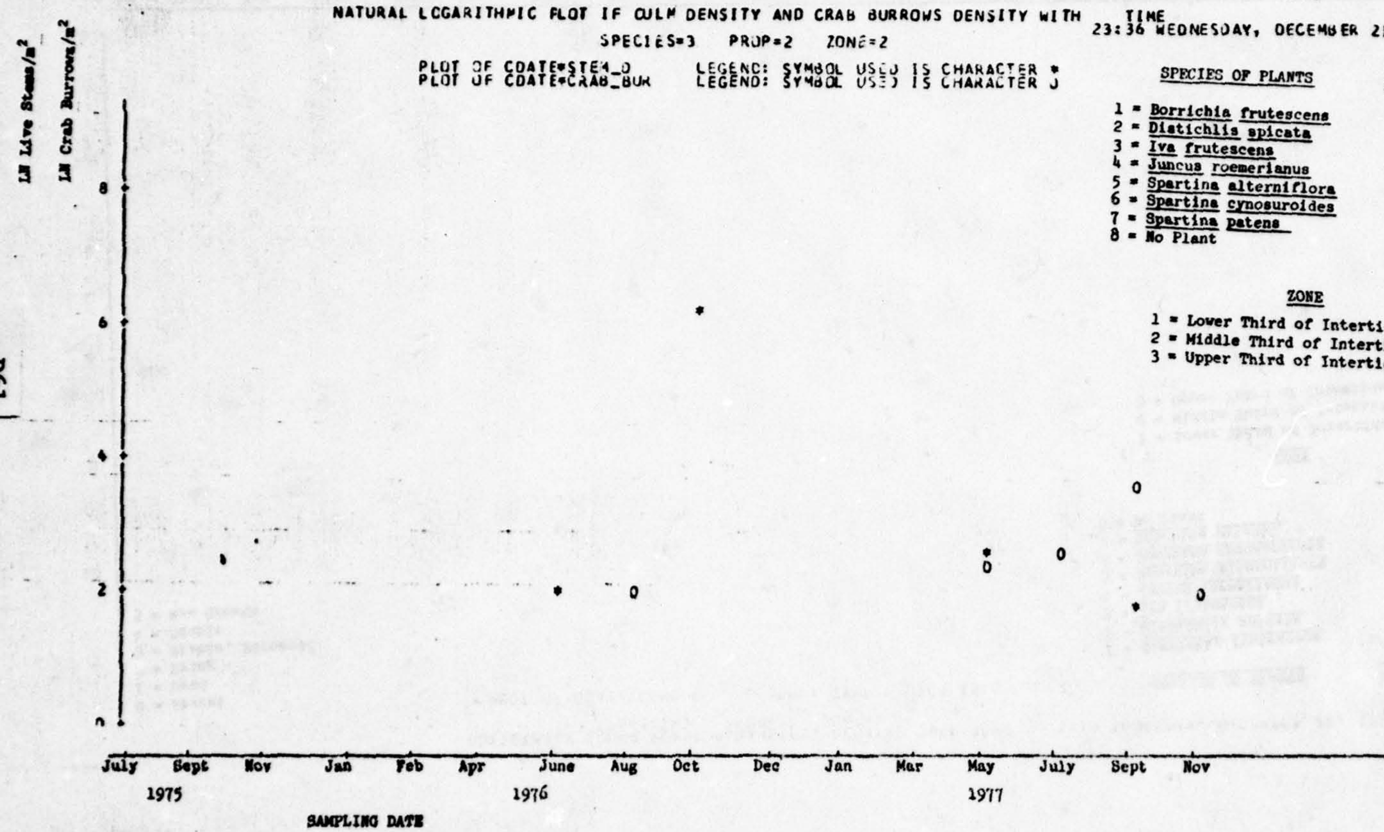
D60

NATURAL LOGARITHMIC PLOT IF CULM DENSITY AND CRAB BURROWS DENSITY WITH TIME

23:36 WEDNESDAY, DECEMBER 21, 1977 18

SPECIES=3 PROP=2 ZONE=2

PLOT OF CDATE*STEM_D LEGEND: SYMBOL USED IS CHARACTER *
PLOT OF CDATE*CRAB_BUR LEGEND: SYMBOL USED IS CHARACTER O



SPECIES OF PLANTS

1 = Borrichia frutescens
2 = Distichlis spicata
3 = Iva frutescens
4 = Juncus roemerianus
5 = Spartina alterniflora
6 = Spartina cynosuroides
7 = Spartina patens
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

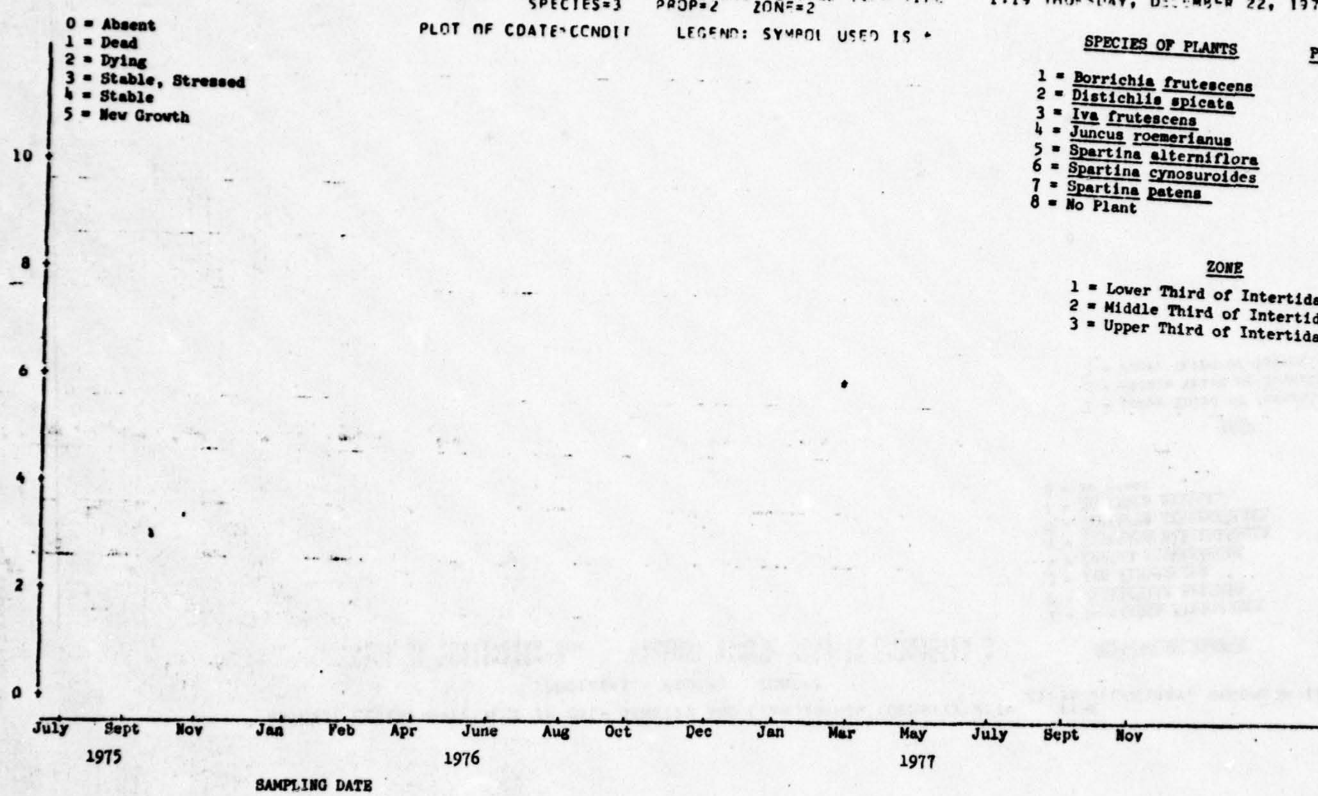
ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

D61

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977   17
SPECIES=3   PROP=2   ZONE=2

PLOT OF CDATE*CONDIT   LEGEND: SYMBOL USED IS *



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

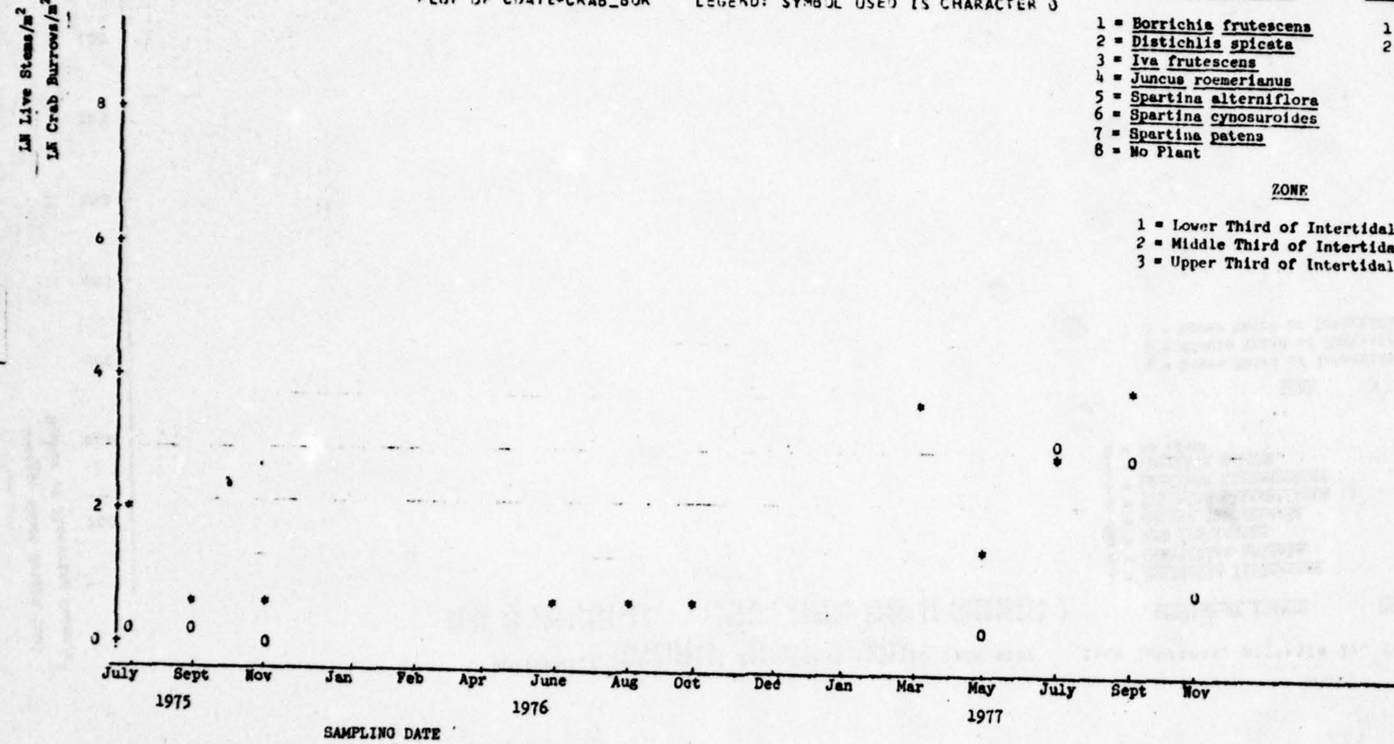
1

NATURAL LOGARITHMIC PLOT IF CULM DENSITY AND CRAB BURROWS DENSITY WITH TIME

23:36 WEDNESDAY, DECEMBER 21, 1977 20

SPECIES=4 PROP=1 ZONE=2

PLOT OF CDATE*STEM_D LEGEND: SYMBOL USED IS CHARACTER *
PLOT OF CDATE*CRAB_BUR LEGEND: SYMBOL USED IS CHARACTER 0



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

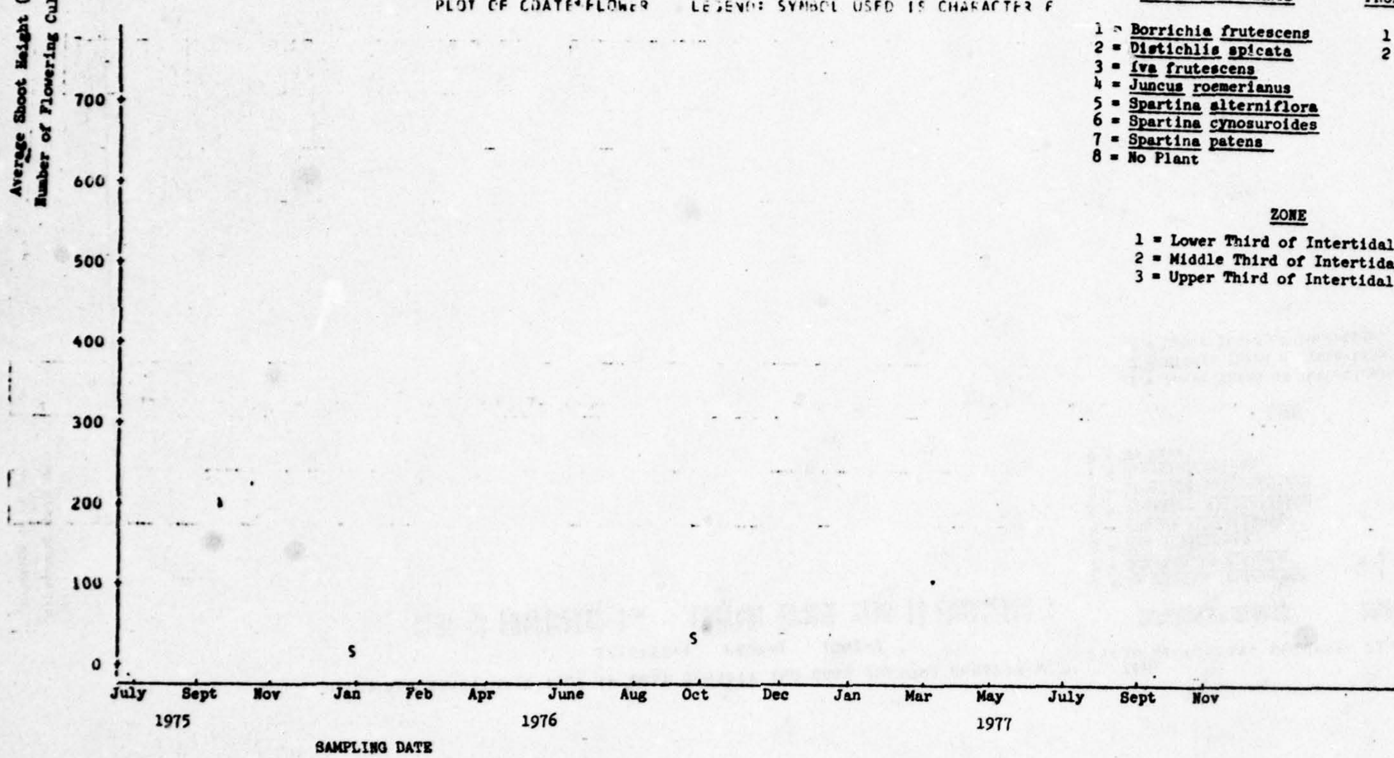
1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 1:19 THURSDAY, DECEMBER 22, 1977 44
SPECIES=3 PROP=1 ZONE=2

PLOT OF CDATE*SH_HT LEGEND: SYMBOL USED IS CHARACTER S
PLOT OF CDATE*FLOWER LEGEND: SYMBOL USED IS CHARACTER F



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

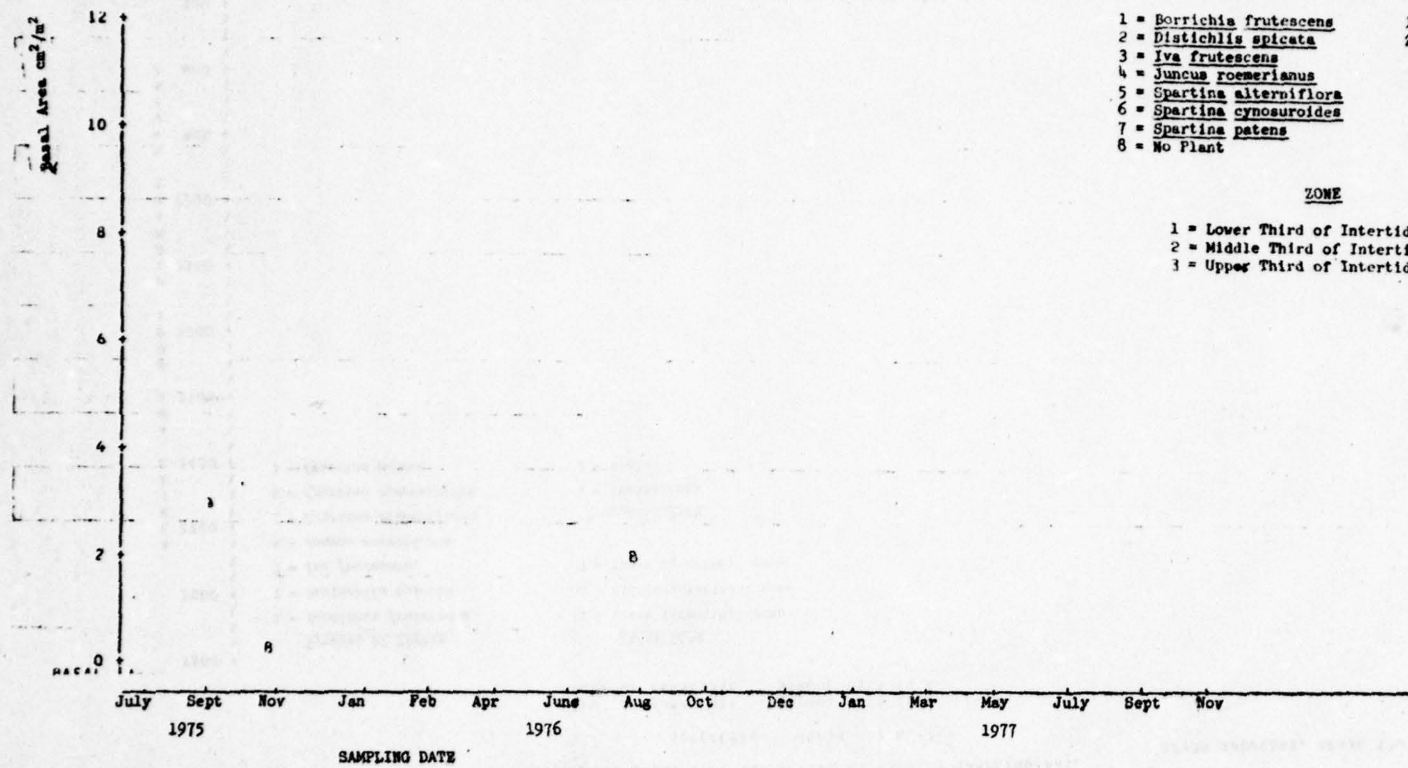
1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977 135
SPECIES=4 PROP=1 ZONE=2

PLOT OF CDATE*BASAL   LEGEND: SYMBOL USED IS 8



SPECIES OF PLANTS

1 = Borrichia frutescens
2 = Distichlis spicata
3 = Iva frutescens
4 = Juncus roemerianus
5 = Spartina alterniflora
6 = Spartina cynosuroides
7 = Spartina patens
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

ZONE

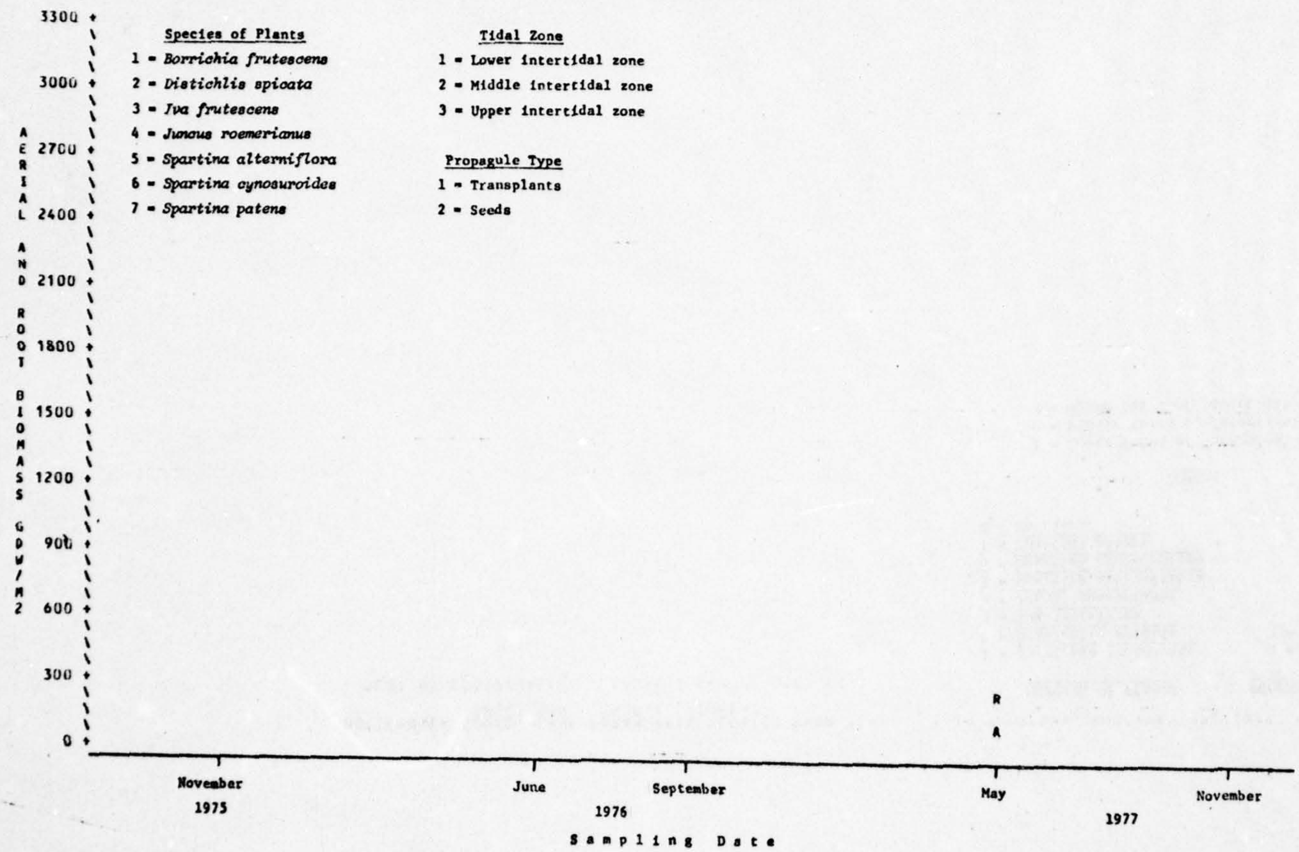
1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

D65

BUTTERMILK SOUND ROOT AND AERIAL BIOMASS BY SAMPLING DATE

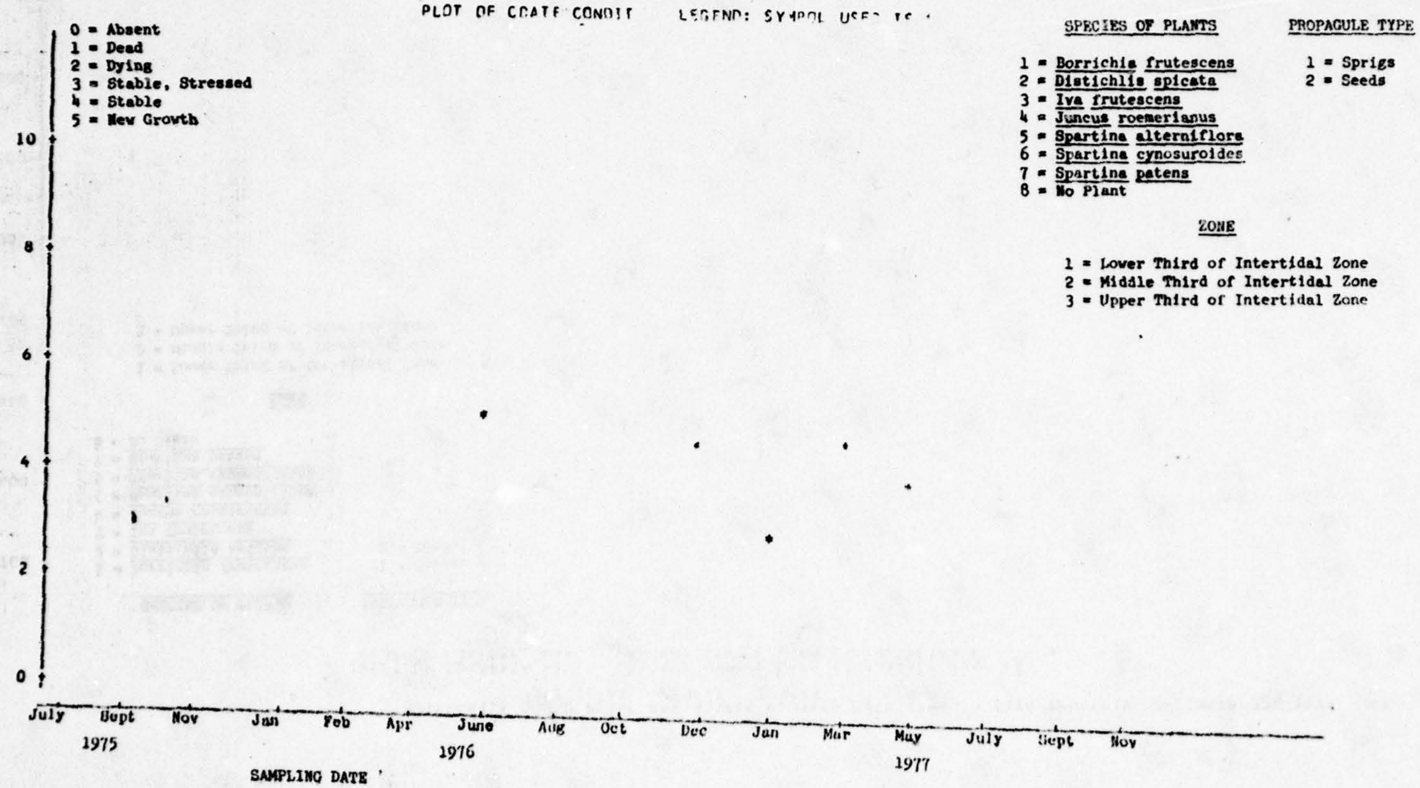
SPECIES=4 PROP=1 ZONE=2

PLOT OF ROM*CDATE SYMBOL USED IS R
PLOT OF AER*CDATE SYMBOL USED IS A



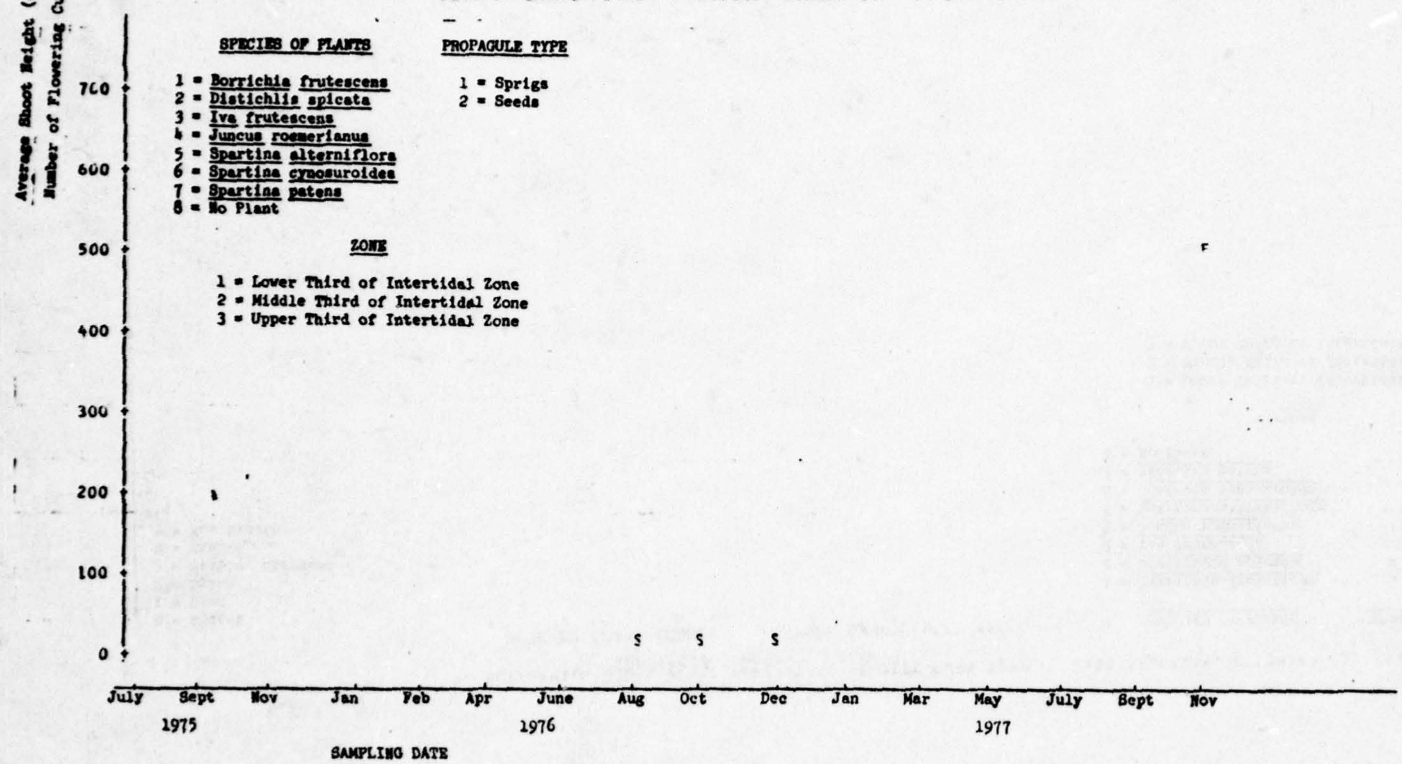
BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977   18
SPECIES=3   PROP=2   ZONE=3

PLOT OF CRATE CONDIT   LEGEND: SYMBOL USED IS .



BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977   47
SPECIES=3   PROP=2   ZONE=3

PLOT OF CDATE*SH_HT   LEGEND: SYMBOL USED IS CHARACTER S
PLOT OF CDATE*FLOWER   LEGEND: SYMBOL USED IS CHARACTER F



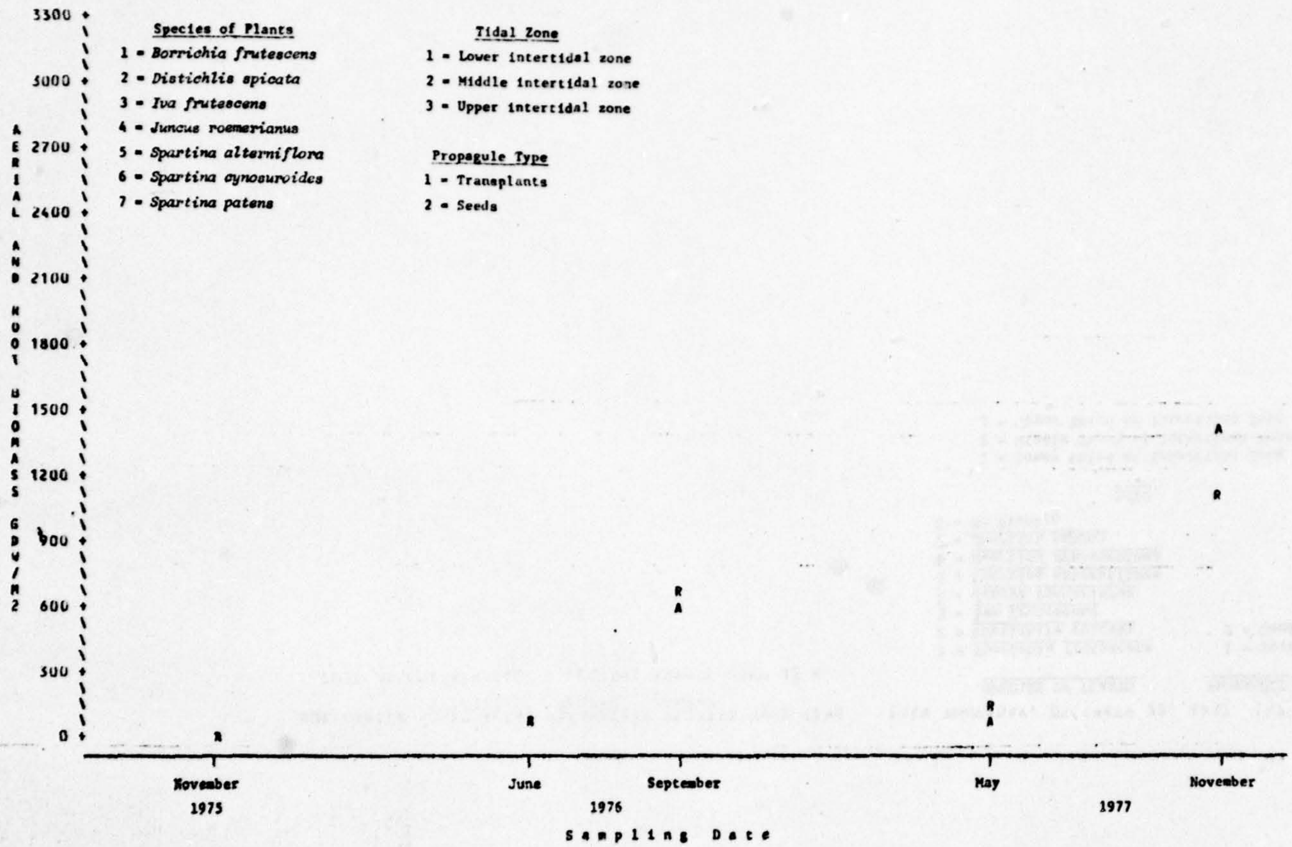
BUTTERMILK SOUND ROOT AND AERIAL BIOMASS BY SAMPLING DATE 15

17:35 THURSDAY, APRIL 13, 1978

SPECIES=4 PROP=1 ZONE=3

PLOT OF ROM*CDATE SYMBOL USED IS R

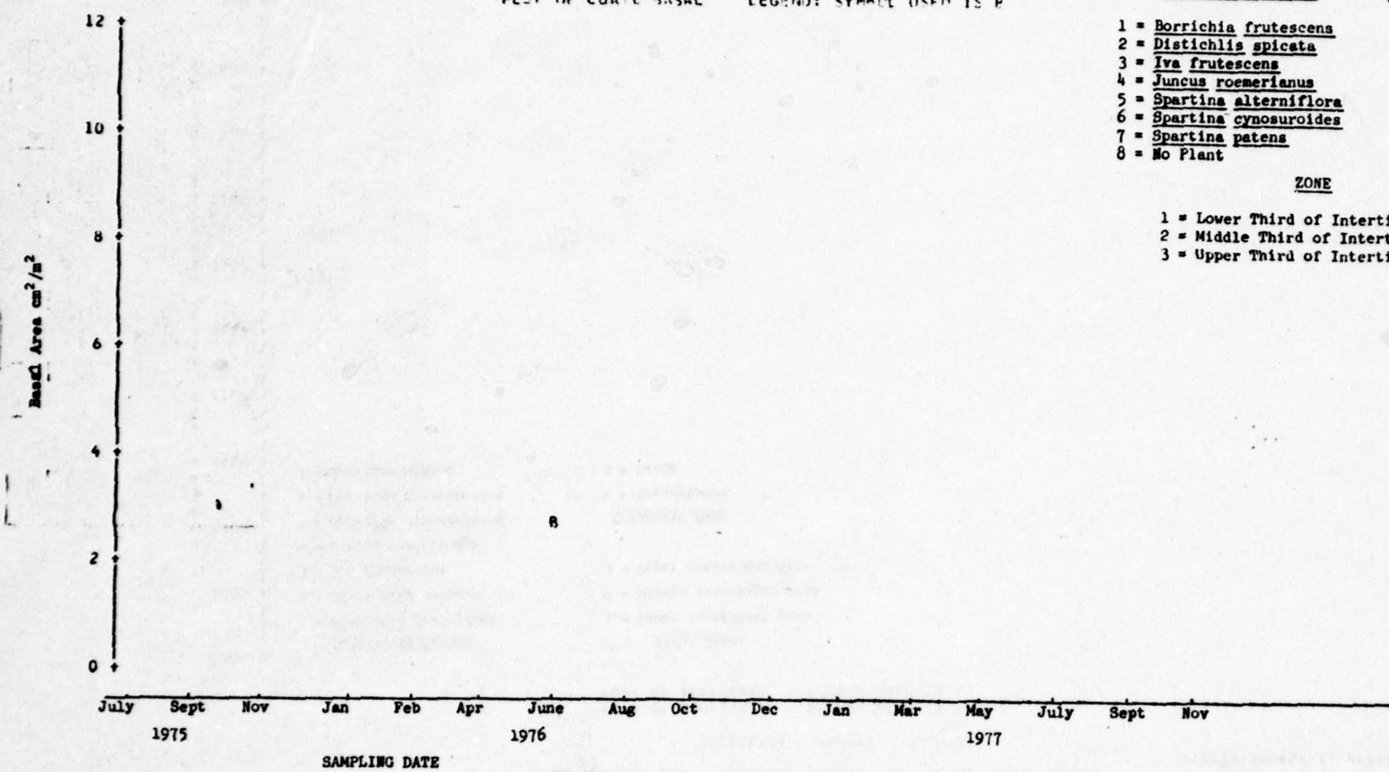
PLOT OF AER*CDATE SYMBOL USED IS A



D69

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977 137
SPECIES=4   PROP=2   ZONE=2

PLOT OF COATE*BASAL   LEGEND: SYMBOL USED IS B



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

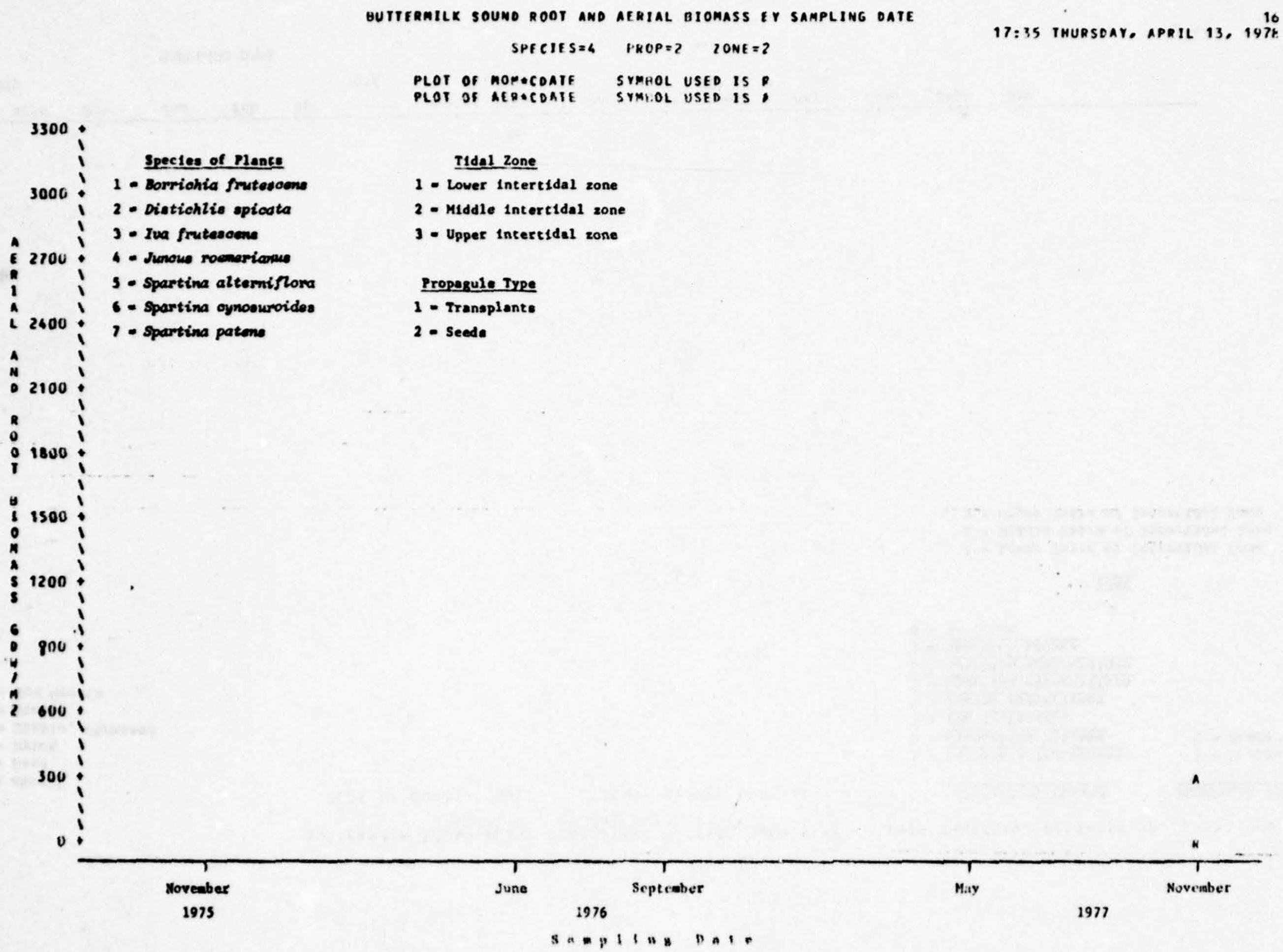
PROPAGULE TYPE

1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

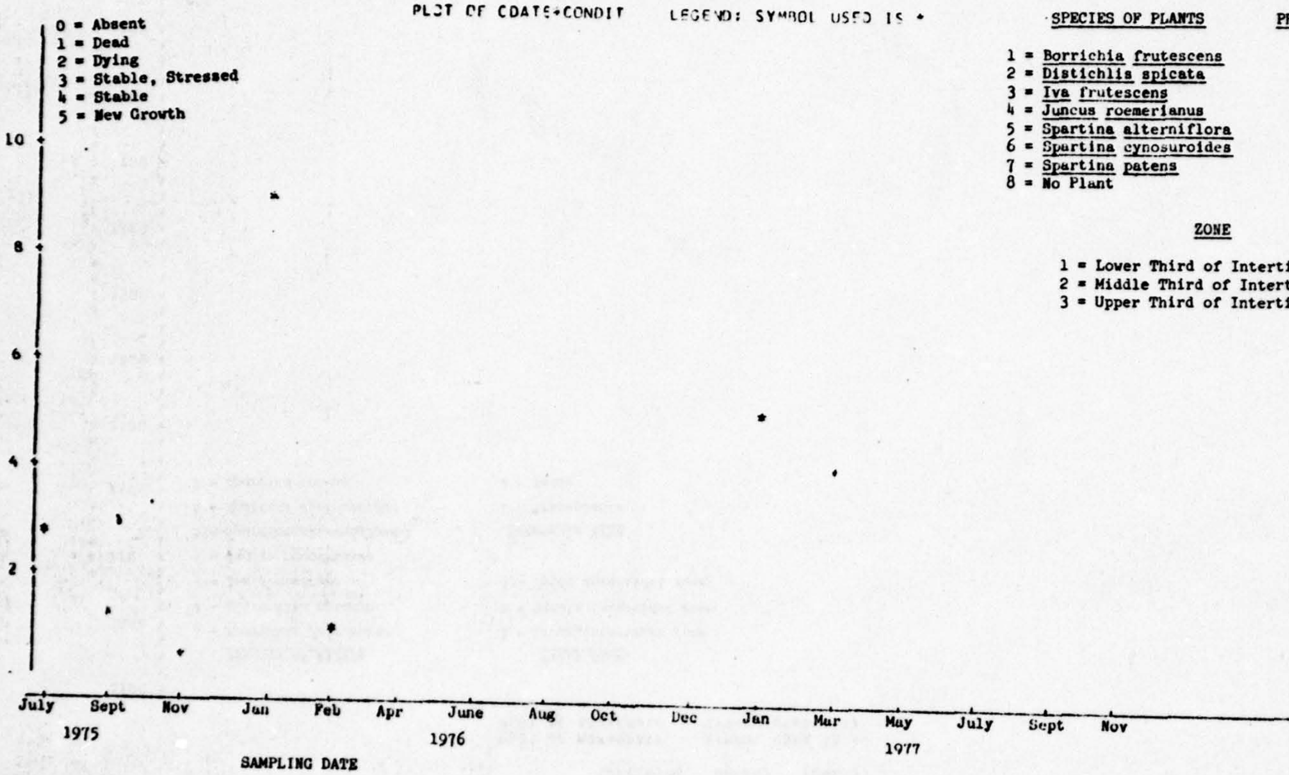
D70


BUTTERMILK SOUND ROOT AND AERIAL BIOMASS BY SAMPLING DATE
SPECIES=4 PROP=2 ZONE=2
PLOT OF MOM*CDATE SYMBOL USED IS R
PLOT OF AER*CDATE SYMBOL USED IS A
Species of Plants
1 = Borrichia frutescens
2 = Distichlis spicata
3 = Iva frutescens
4 = Juncus roemerianus
5 = Spartina alterniflora
6 = Spartina cynosuroides
7 = Spartina patens
Tidal Zone
1 = Lower intertidal zone
2 = Middle intertidal zone
3 = Upper intertidal zone
Propagule Type
1 = Transplants
2 = Seeds
AERIAL AND ROOT BIOMASS G DW/M2
3300
3000
2700
2400
2100
1800
1500
1200
900
600
300
0
A
R
November 1975
June 1976
September
May 1977
November
Sampling Date

D71

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 1:19 THURSDAY, DECEMBER 22, 1977 19
SPECIES=4 PROP=1 ZONE=2

PLOT OF CDATE*CONDIT LEGEND: SYMBOL USED IS *



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

ZONE

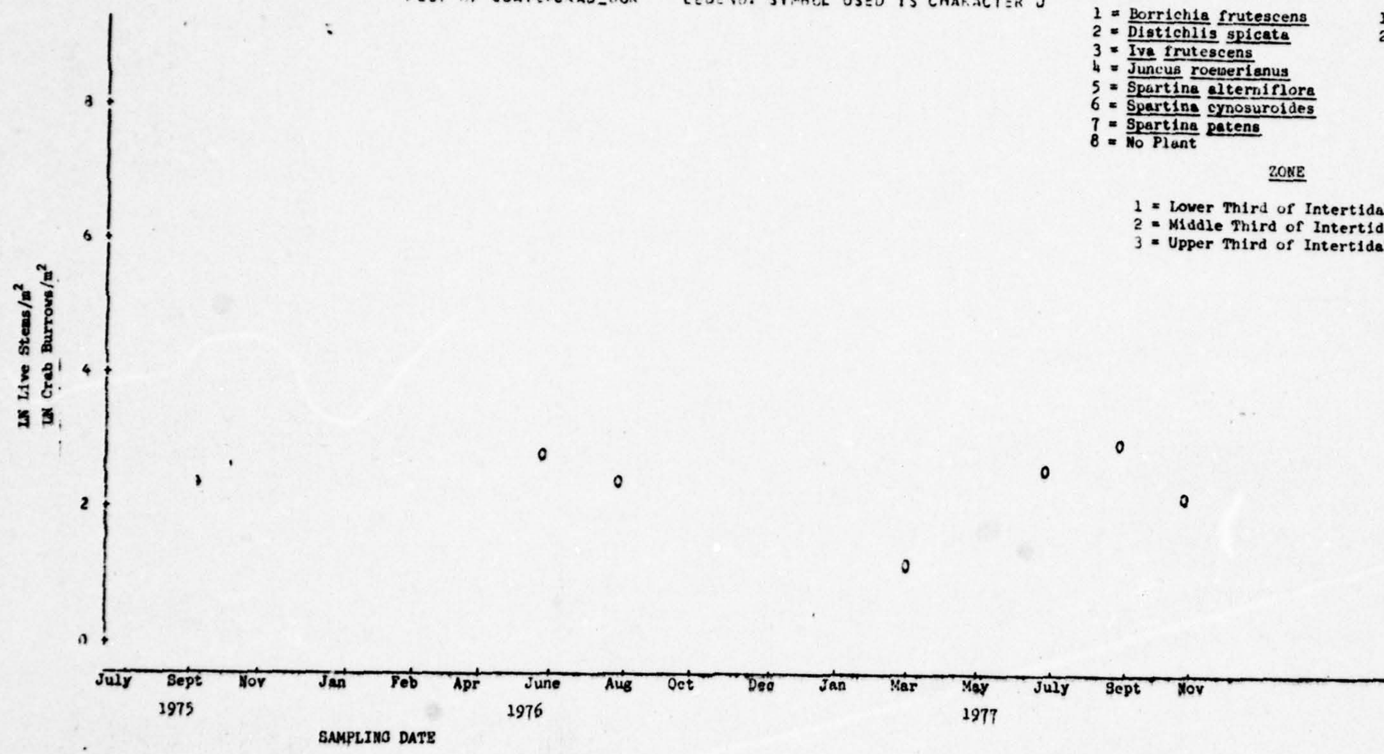
1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

NATURAL LOGARITHMIC PLOT IF CULM DENSITY AND CRAB BURROWS DENSITY WITH TIME

23:36 WEDNESDAY, DECEMBER 21, 1977 22

SPECIES=4 PROP=2 ZONE=2

PLOT OF COATE*CRAB_BUR LEGEND: SYMBOL USED IS CHARACTER O



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

ZONE

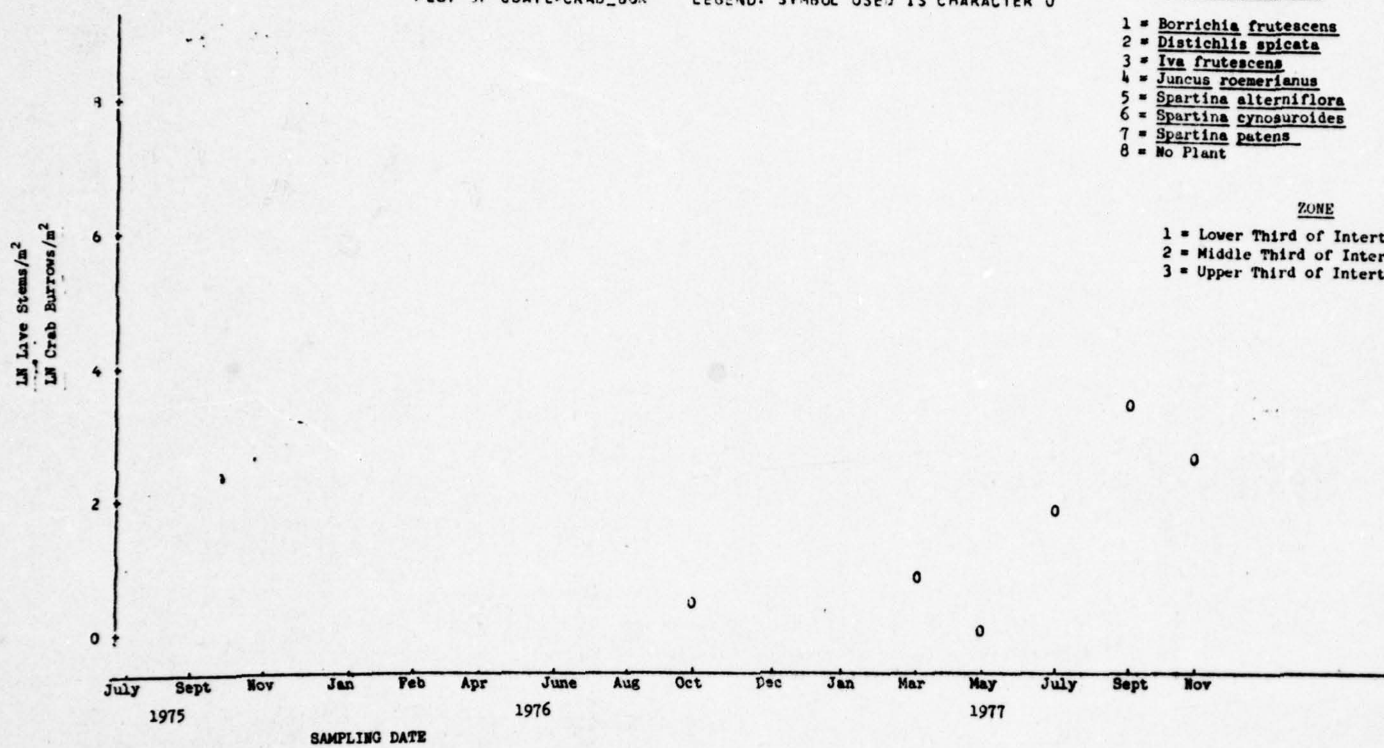
1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

NATURAL LOGARITHMIC PLOT IF CULM DENSITY AND CRAB BURROWS DENSITY WITH TIME

SPECIES=4 PROP=2 ZONE=3

23:36 WEDNESDAY, DECEMBER 21, 1977 23

PLOT OF CDATE*CRAB_BUR LEGEND: SYMBOL USED IS CHARACTER O



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPI

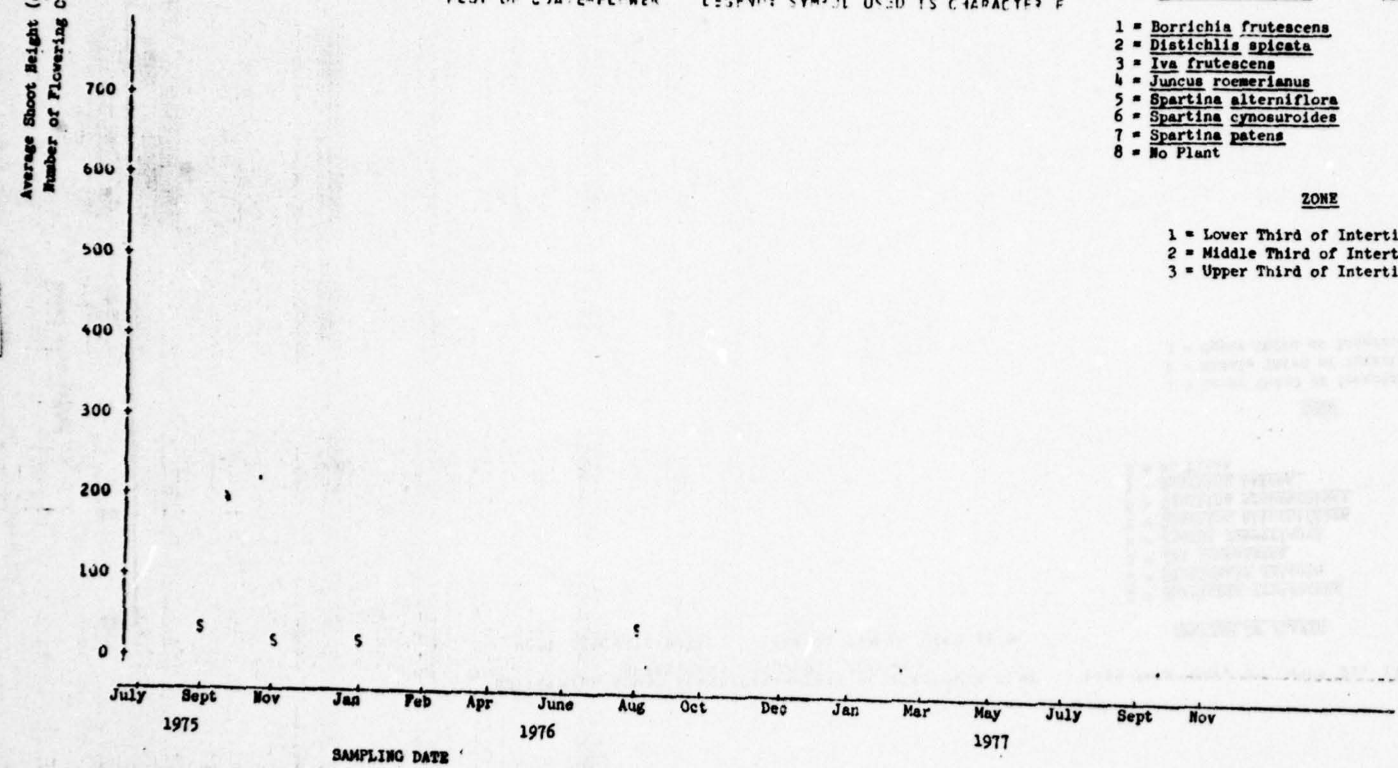
1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977   48
SPECIES=4   PROP=1   ZONE=2

PLOT OF SDATE*SH_HT   LEGEND: SYMBOL USED IS CHARACTER S
PLOT OF SDATE*FLOWER   LEGEND: SYMBOL USED IS CHARACTER F



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

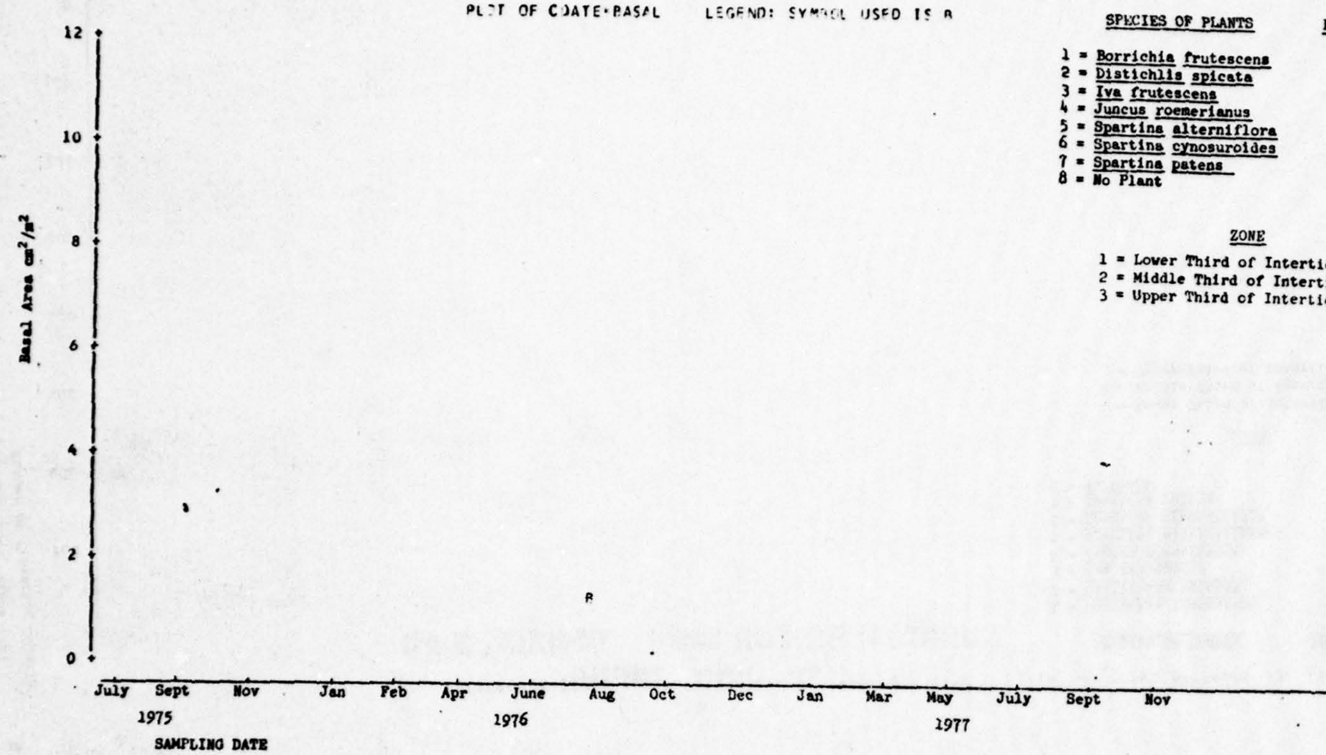
1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 1:19 THURSDAY, DECEMBER 22, 1977 138
SPECIES=4 PROP=2 ZONE=3

PLOT OF CDATE*BASAL LEGEND: SYMBOL USED IS B



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

ZONE

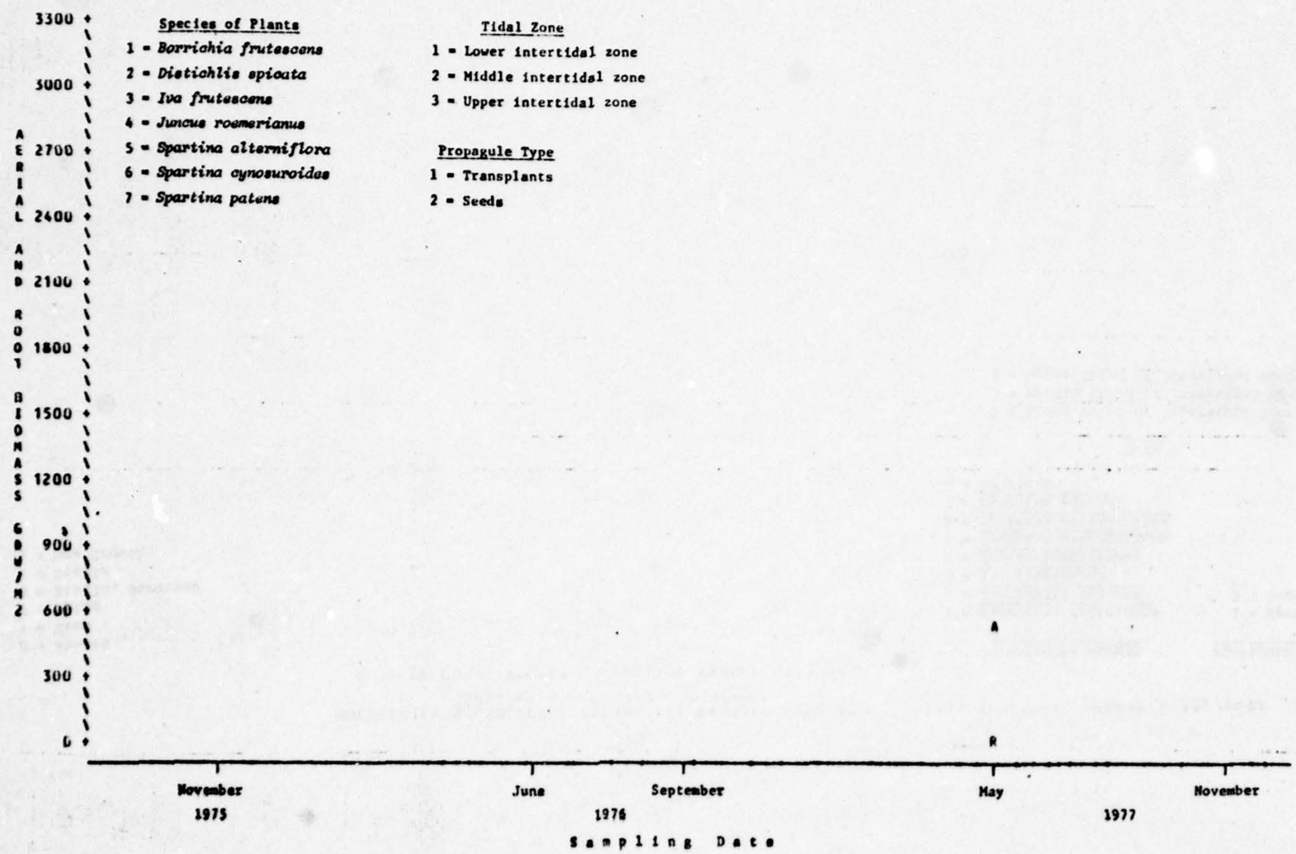
1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

BUTTERMILK SOUND ROOT AND AERIAL BIOMASS BY SAMPLING DATE

17:35 THURSDAY, APRIL 13, 1978

SPECIES=4 PROP=2 ZONE=3

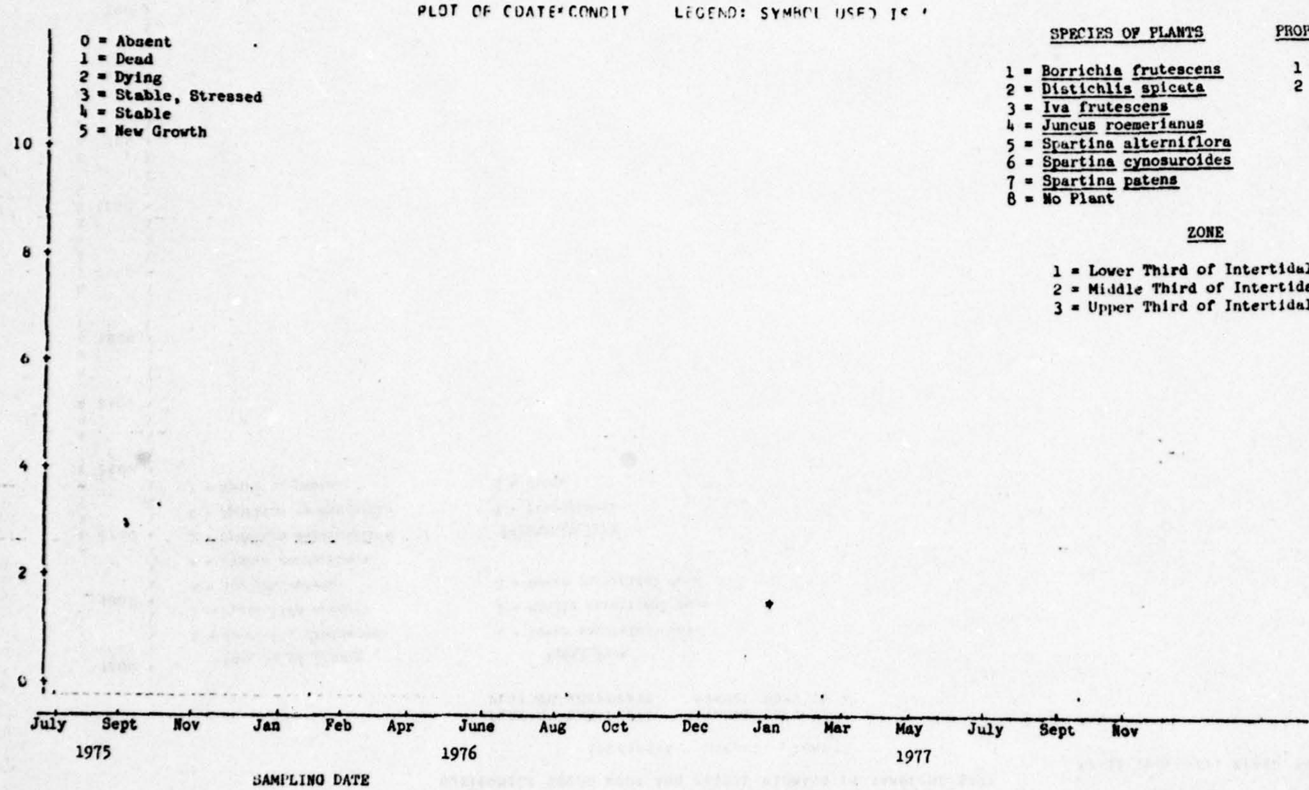
PLOT OF MOM*CDATE SYMBOL USED IS R
PLOT OF AER*CDATE SYMBOL USED IS A



BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977   22
SPECIES=4   PROP=2   ZONE=3

PLOT OF CDATE*CONDIT   LEGEND: SYMBOL USED IS *

0 = Absent
1 = Dead
2 = Dying
3 = Stable, Stressed
4 = Stable
5 = New Growth



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

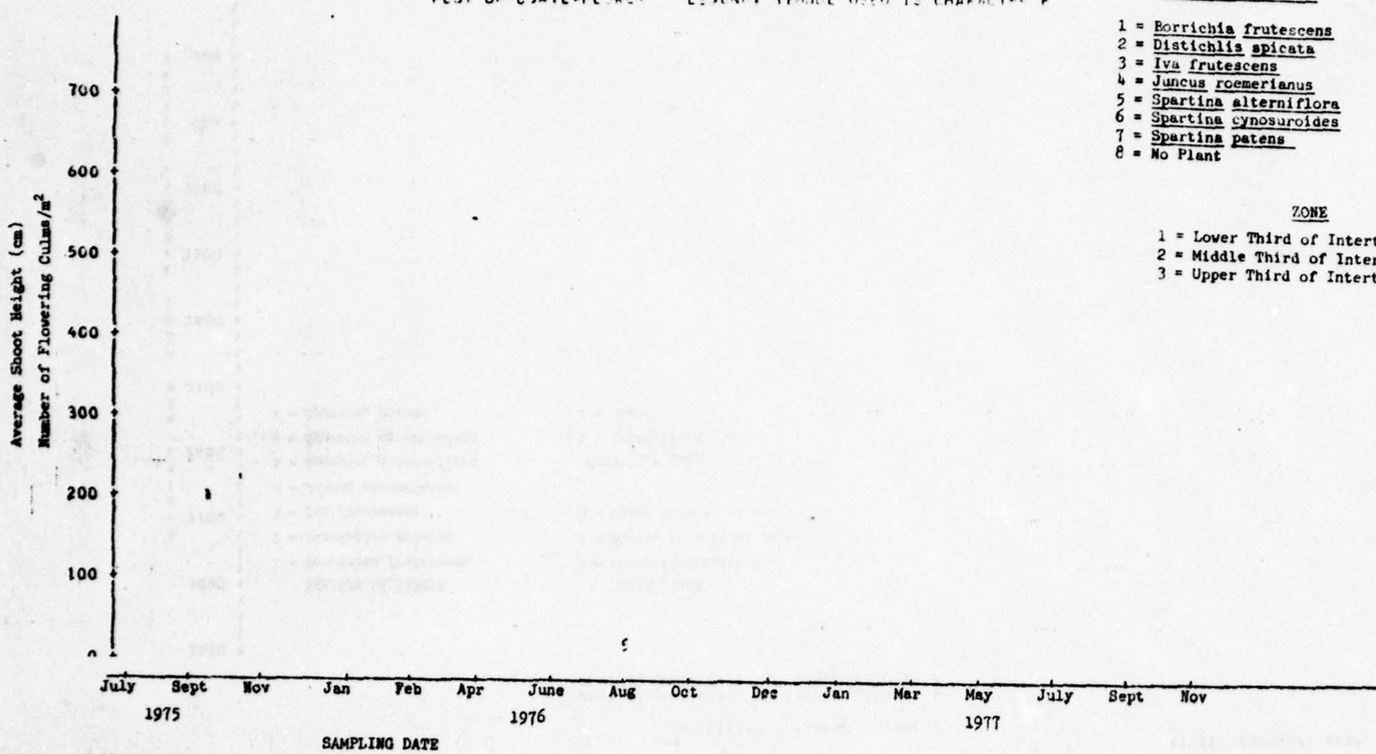
1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977   51
SPECIES=4   PROP=2   ZONE=3

PLOT OF CDATE*SH_HT   LEGEND: SYMBOL USED IS CHARACTER S
PLOT OF CDATE*FLOWER   LEGEND: SYMBOL USED IS CHARACTER F



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

ZONE

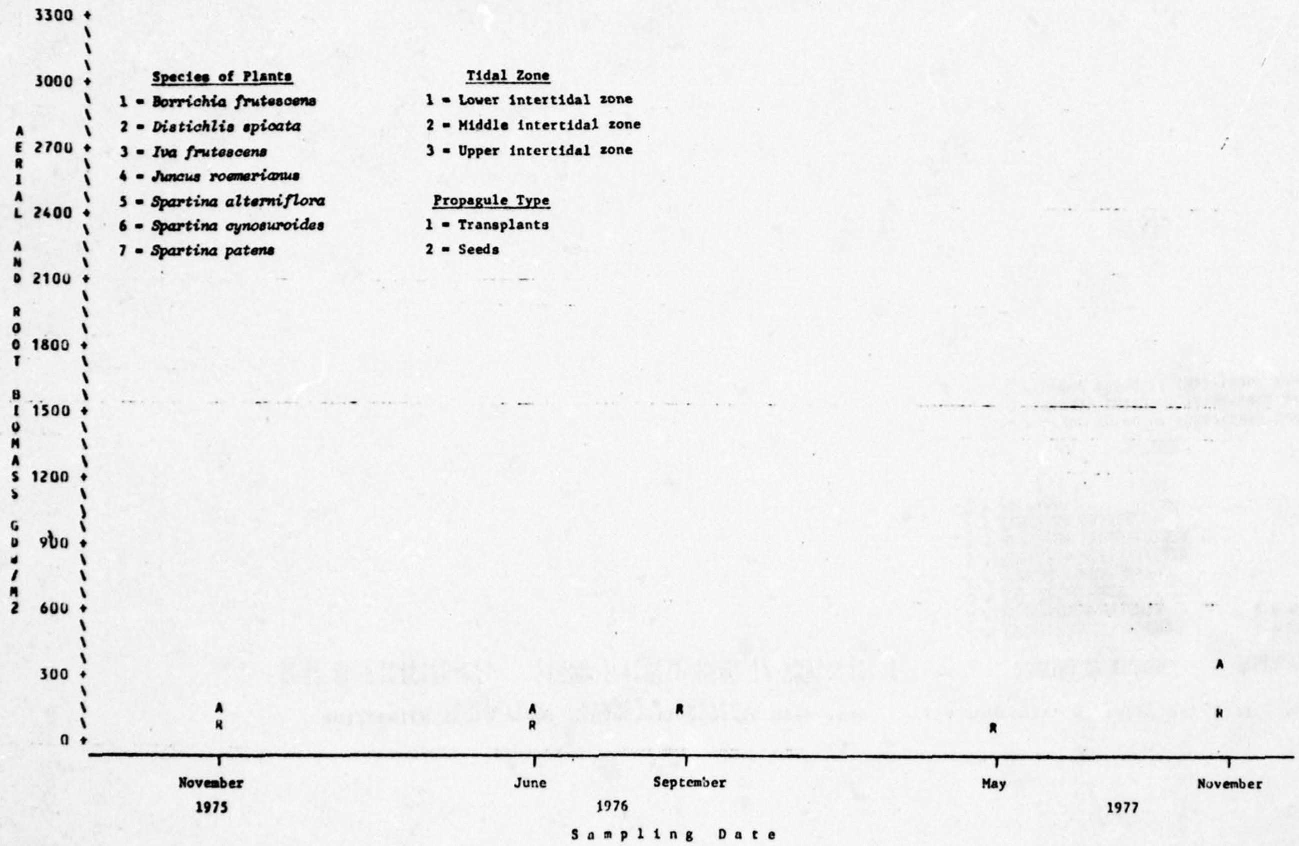
1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

BUTTERMILK SOUND ROOT AND AERIAL BIOMASS BY SAMPLING DATE 18

17:35 THURSDAY, APRIL 13, 1978

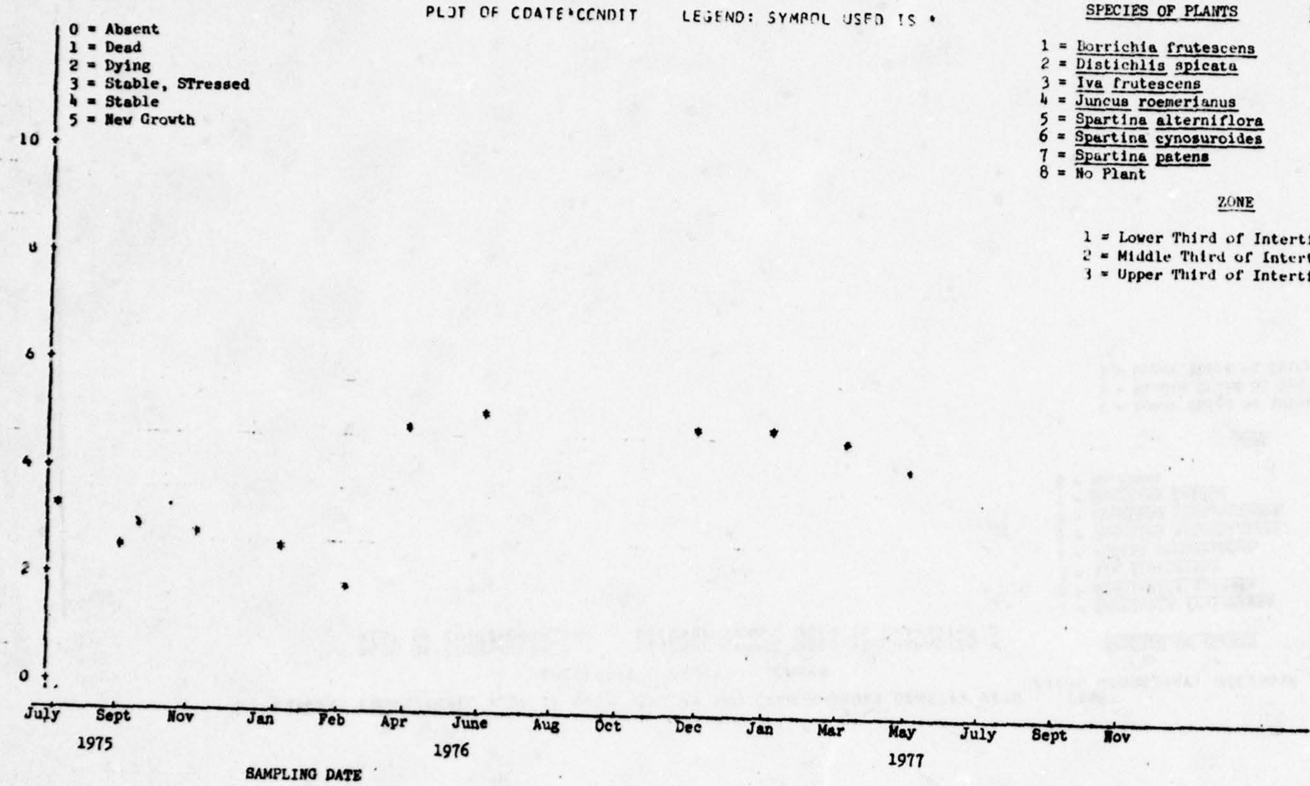
SPECIES=5 PROP=1 ZONE=2

PLOT OF MOM*CDATE SYMBOL USED IS R
PLOT OF AER*CDATE SYMBOL USED IS A



BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977   20
SPECIES=4   PROP=1   ZONE=3

PLOT OF CDATE*CONDIT   LEGEND: SYMBOL USED IS *



SPECIES OF PLANTS

1 = Borrichia frutescens
2 = Distichlis spicata
3 = Iva frutescens
4 = Juncus roemerianus
5 = Spartina alterniflora
6 = Spartina cynosuroides
7 = Spartina patens
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

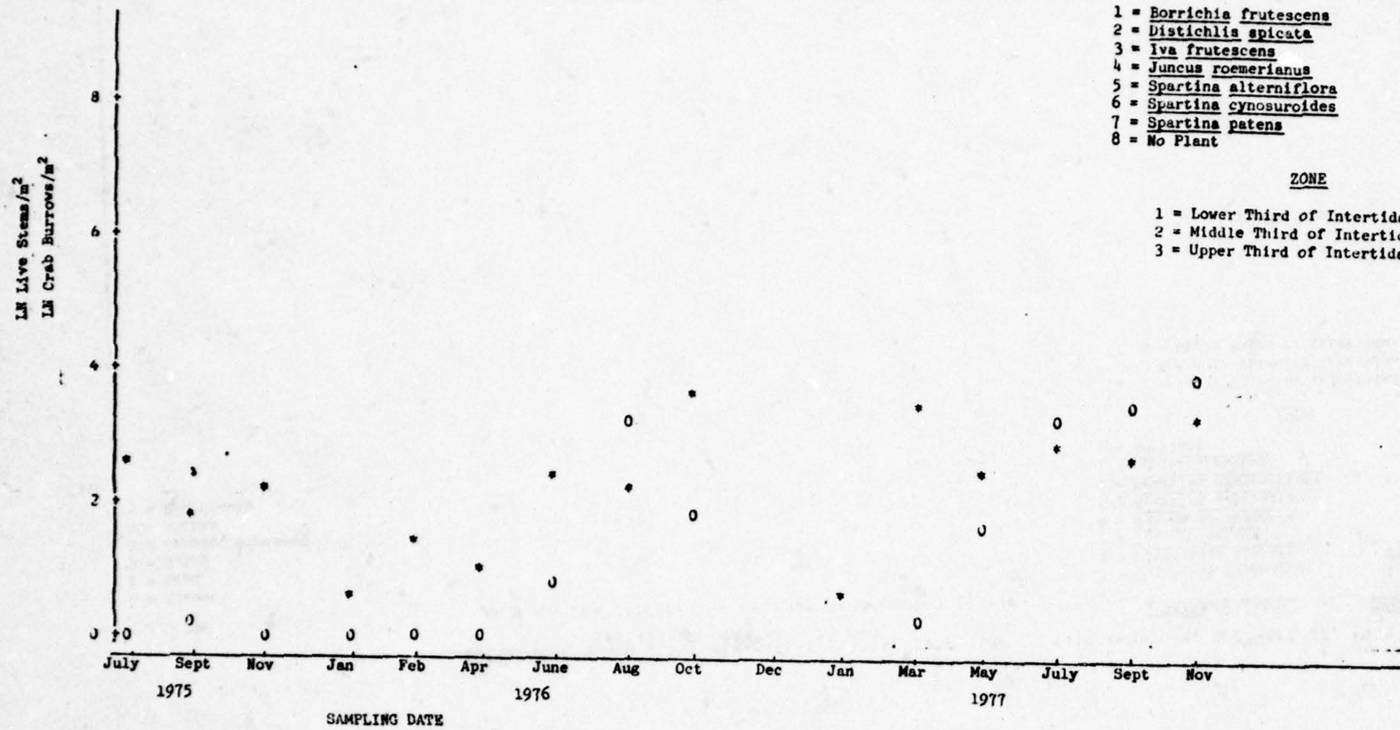
ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

NATURAL LOGARITHMIC PLOT OF CULM DENSITY AND CRAB BURROWS DENSITY WITH TIME

SPECIES=5 PROP=1 ZONE=3

PLOT OF CDATE*STEM_D LEGEND: SYMBOL USED IS CHARACTER *
PLOT OF CDATE*CRAB_BUR LEGEND: SYMBOL USED IS CHARACTER 0



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

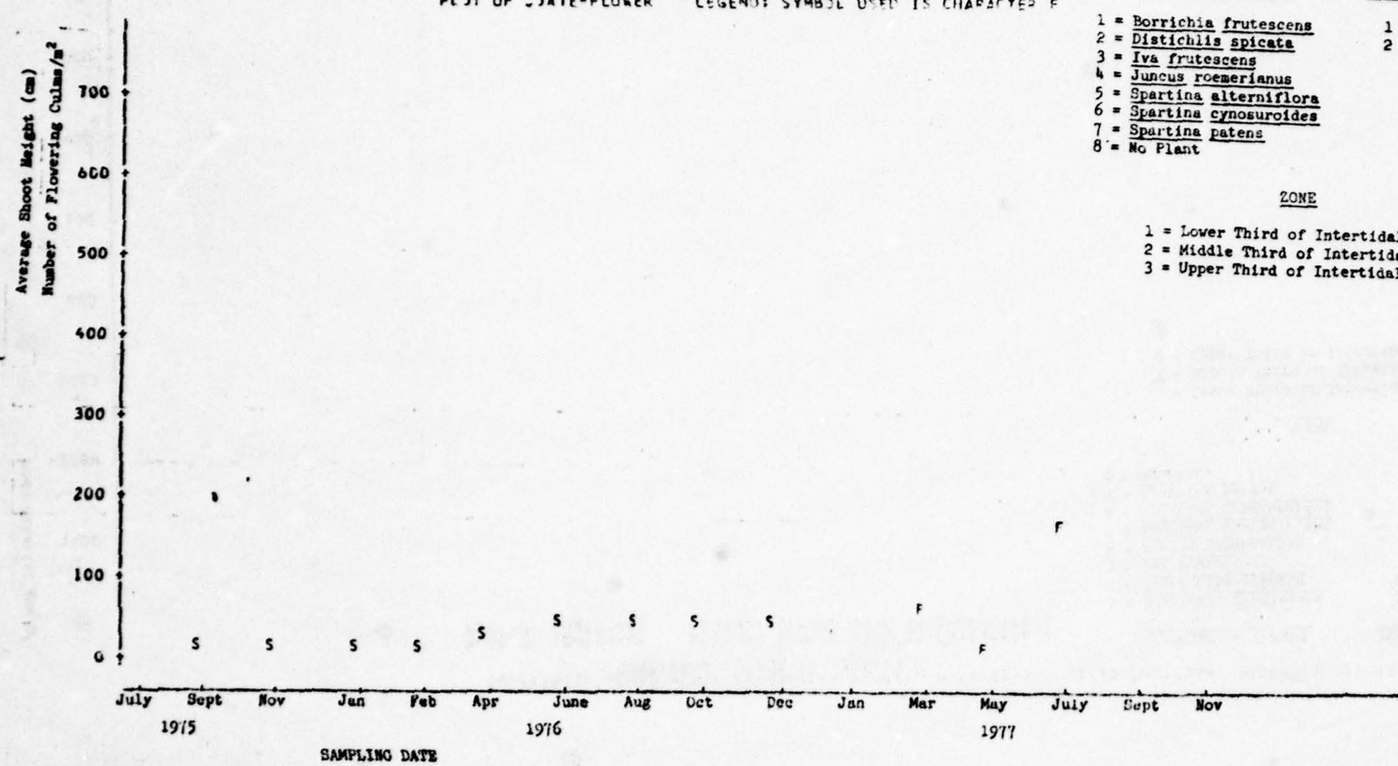
1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 1:19 THURSDAY, DECEMBER 22, 1977 69
SPECIES=4 PROP=1 ZONE=3

PLOT OF SDATE*SH_HT LEGEND: SYMBOL USED IS CHARACTER S
PLOT OF SDATE*FLOWER LEGEND: SYMBOL USED IS CHARACTER F



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

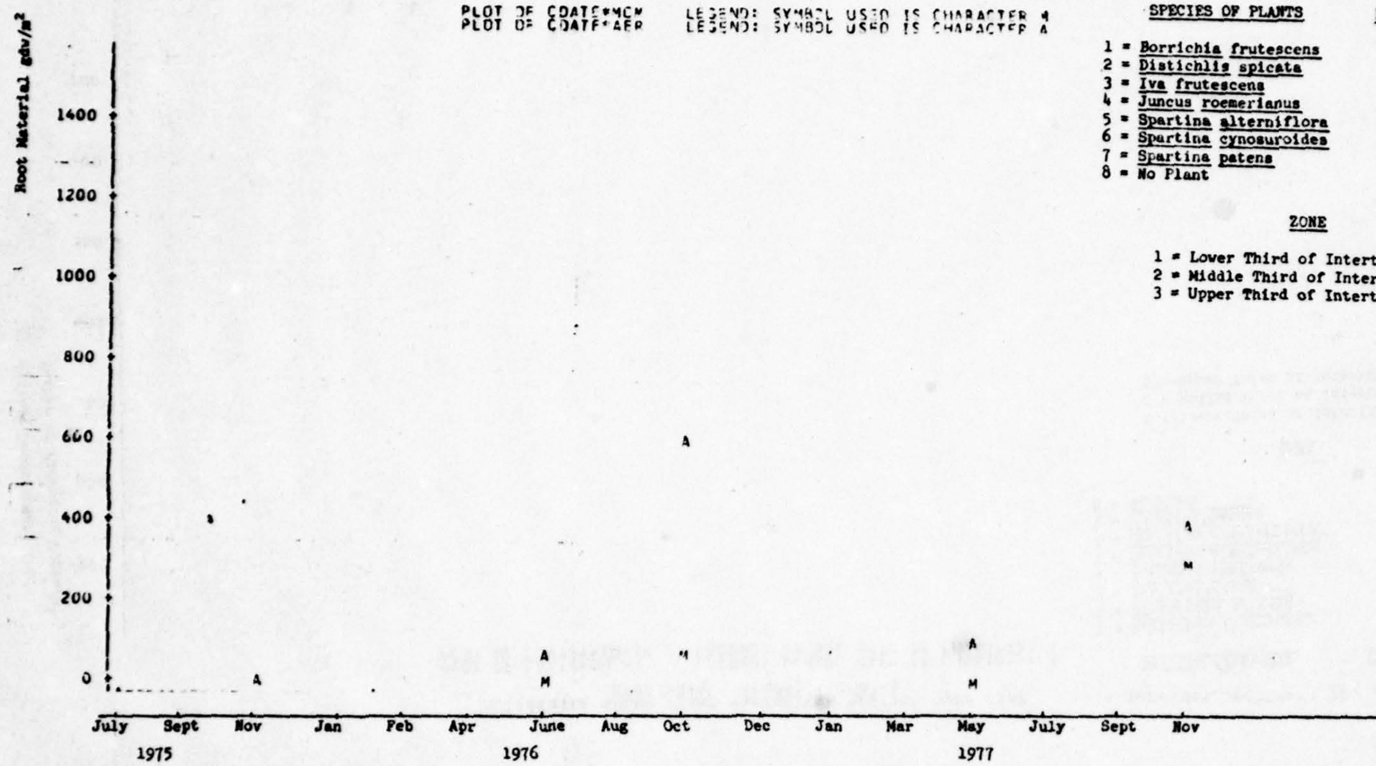
1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977 137
SPECIES=4   PROP=1   ZONE=3

PLOT OF CDATE*MCM   LEGEND: SYMBOL USED IS CHARACTER M
PLOT OF CDATE*AER   LEGEND: SYMBOL USED IS CHARACTER A



SAMPLING DATE (Points represent mean for hourly samples taken over 26 hour period)

SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

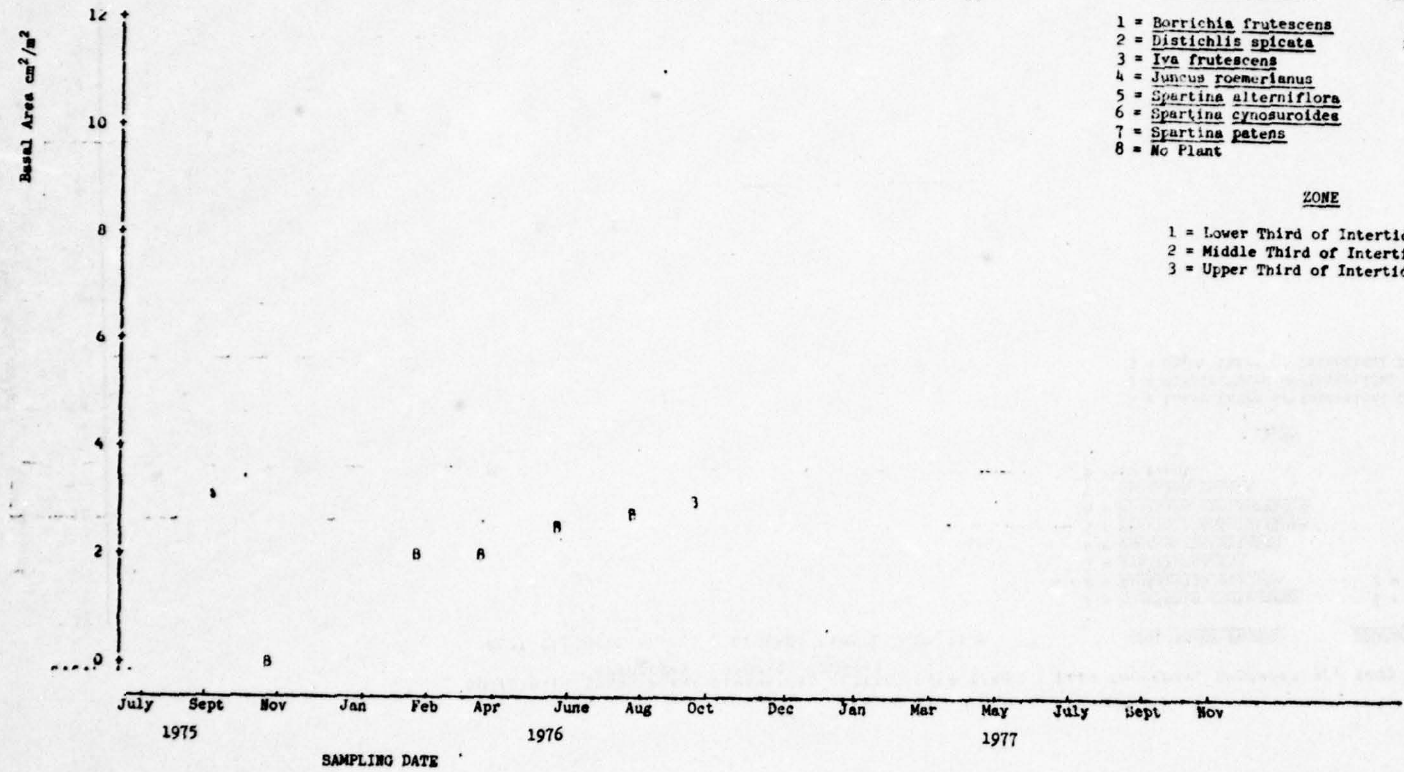
1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977   136
SPECIES=4   PROP=1   ZONE=3

PLOT OF CDATE*BASAL   LEGEND: SYMBOL USED IS B



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

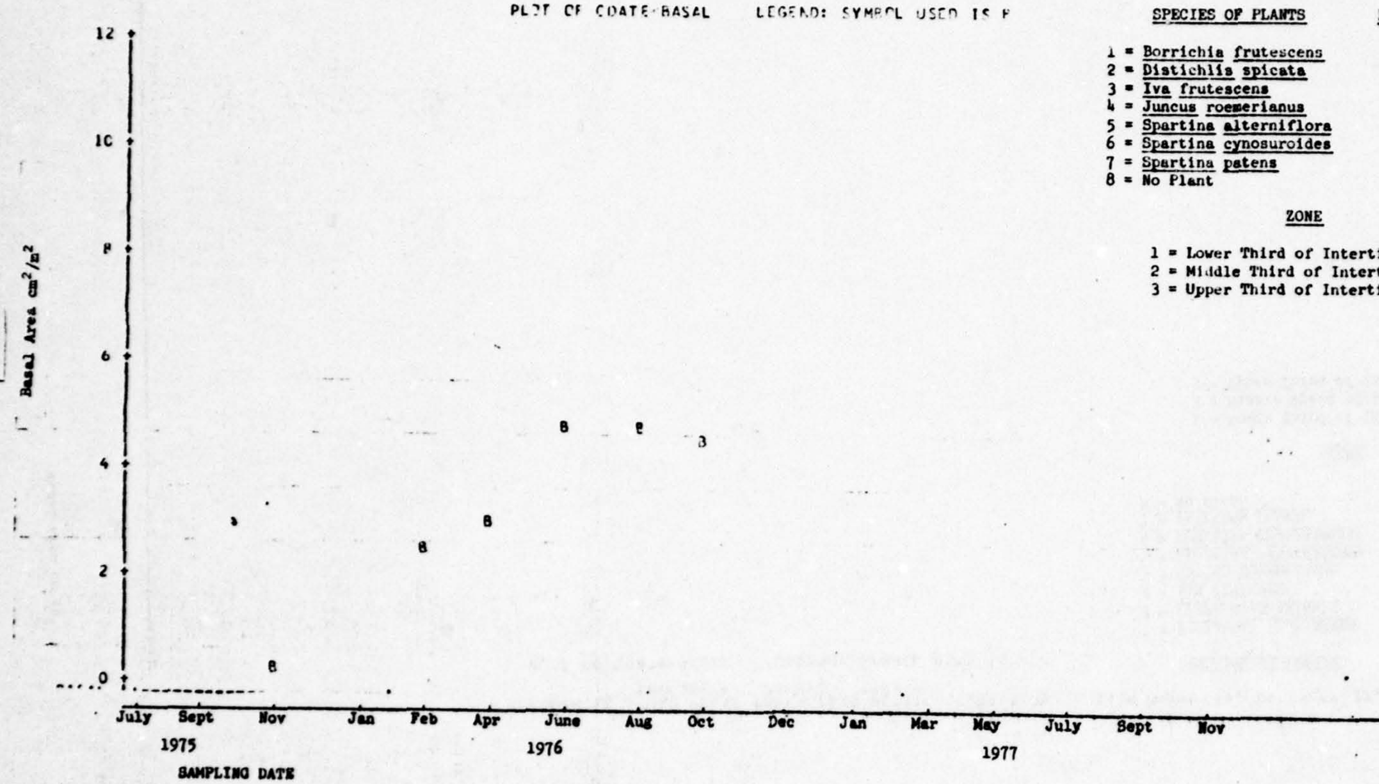
1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 1:19 THURSDAY, DECEMBER 22, 1977 140
SPECIES=5 PROP=1 ZONE=3

PLOT OF COATE-BASAL LEGEND: SYMBOL USED IS 8



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

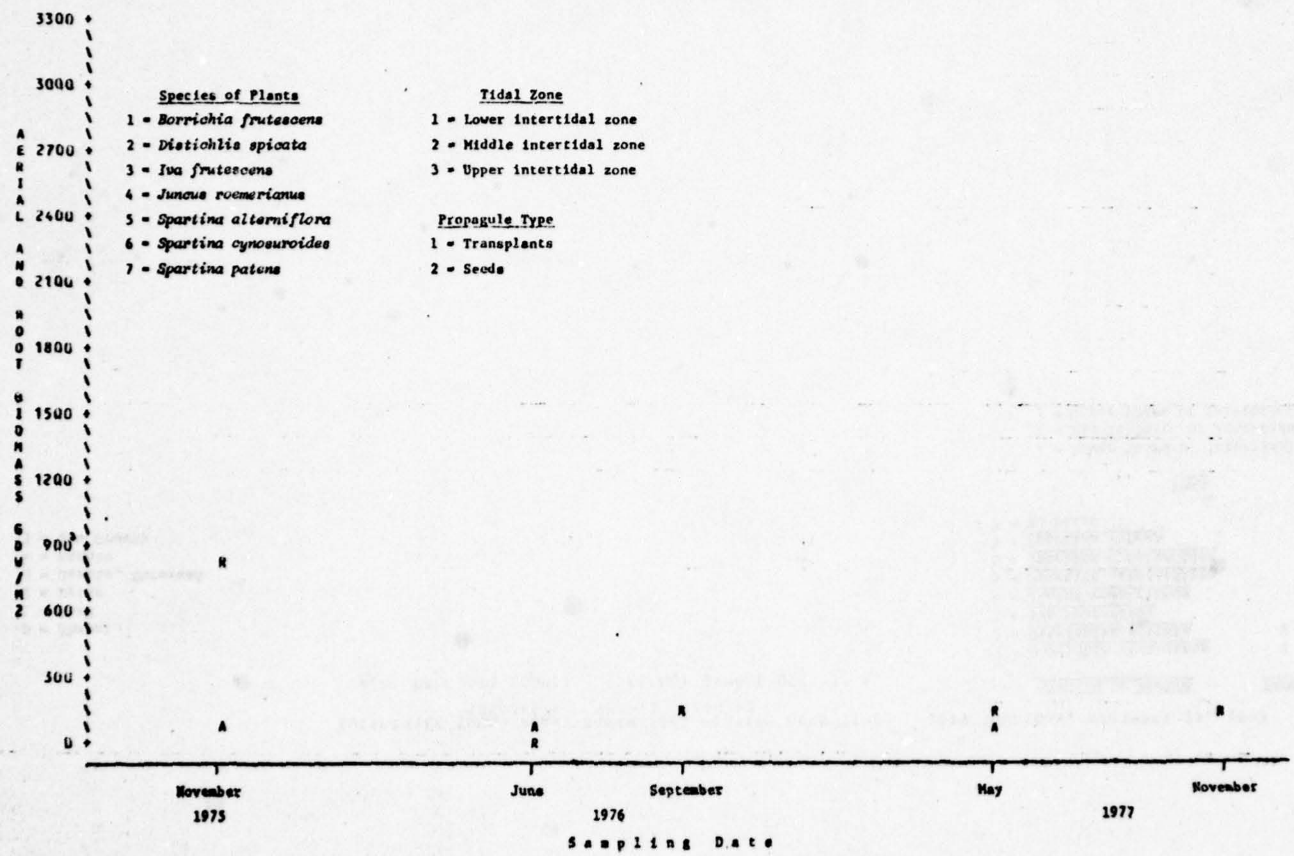
ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

BUTTERMILK SOUND ROOT AND AERIAL BIOMASS BY SAMPLING DATE 17:35 THURSDAY, APRIL 13, 1978 19

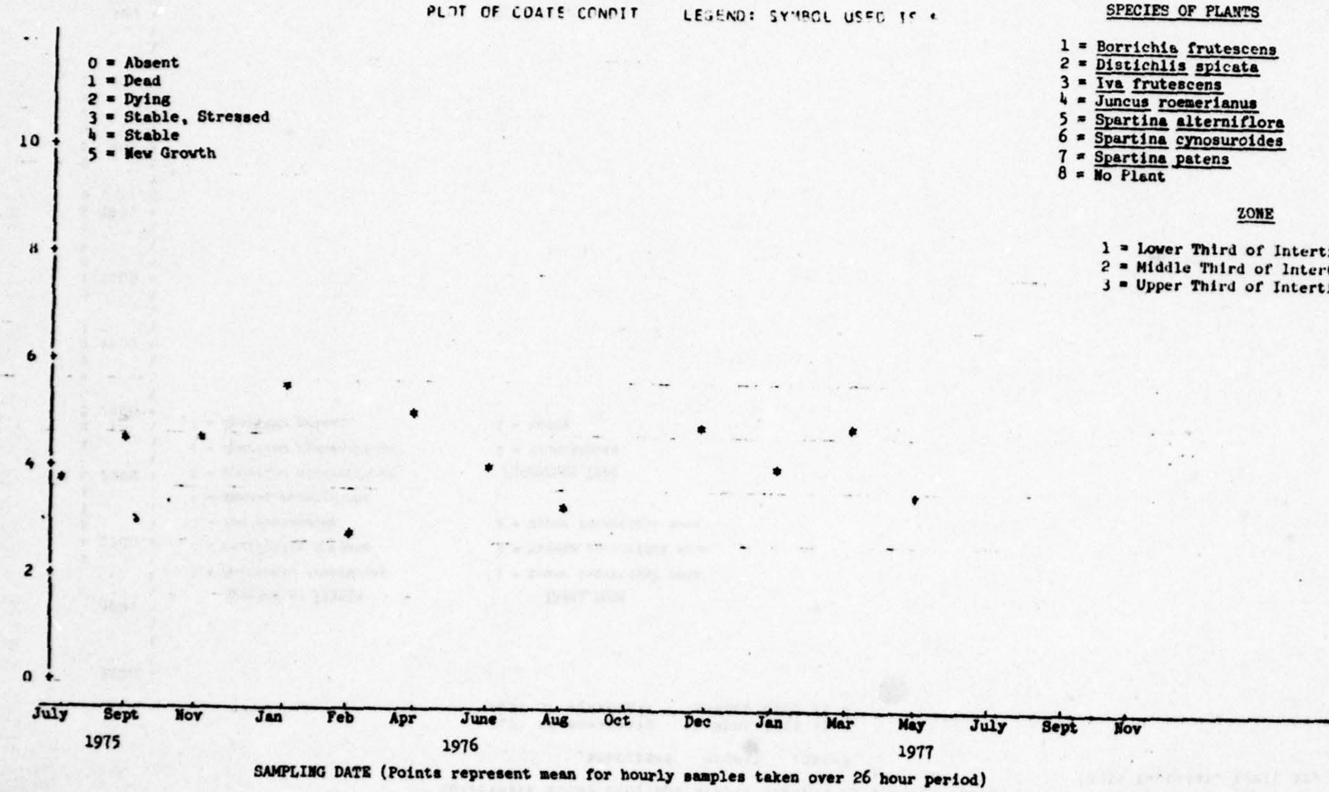
SPECIES=5 PROP=1 ZONE=3

PLOT OF ROM*CDATE SYMBOL USED IS R
PLOT OF AER*CDATE SYMBOL USED IS A



BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977   23
SPECIES=5   PROP=1   ZONE=2

PLOT OF COATS CONDIT   LEGEND: SYMBOL USED IS *



SPECIES OF PLANTS

1 = Borrichia frutescens
2 = Distichlis spicata
3 = Iva frutescens
4 = Juncus roemerianus
5 = Spartina alterniflora
6 = Spartina cynosuroides
7 = Spartina patens
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

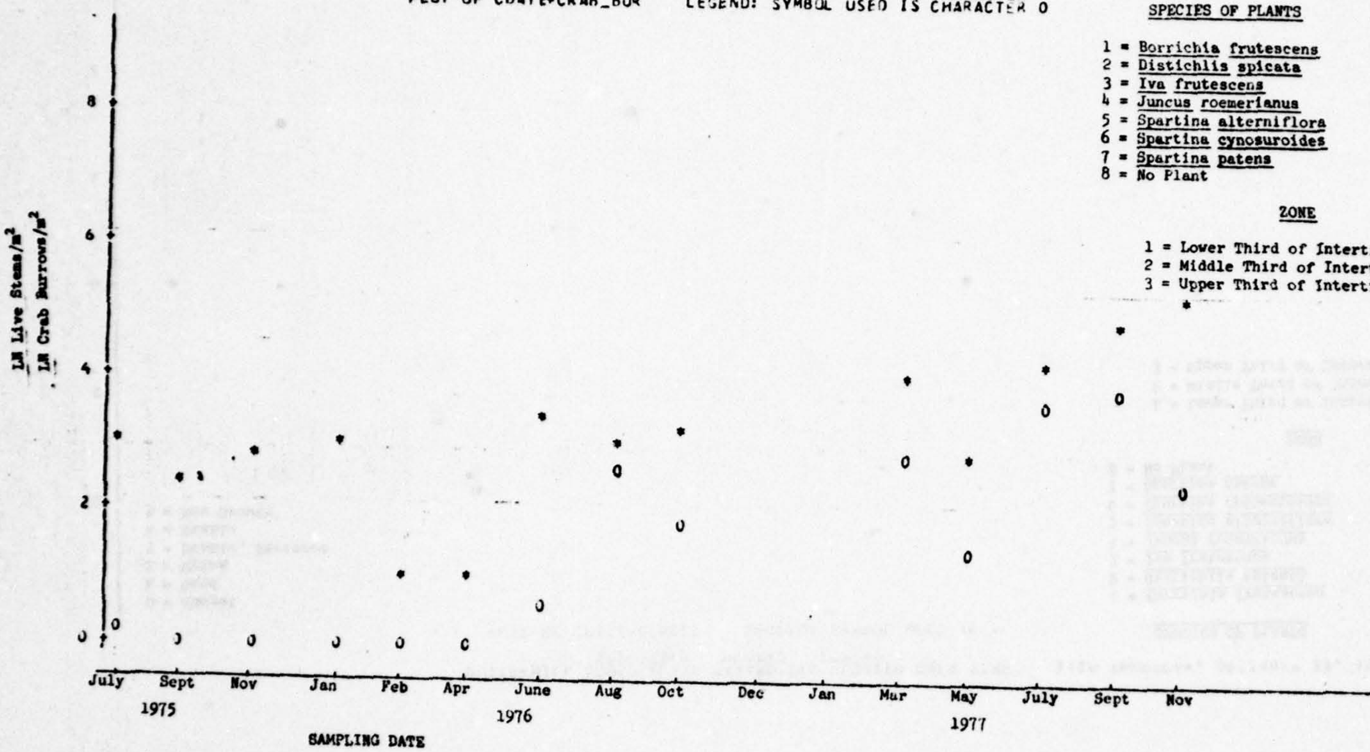
NATURAL LOGARITHMIC PLOT IF CULM DENSITY AND CRAB BURROWS DENSITY WITH TIME

SPECIES=5 PROP=1 ZONE=2

23:36 WEDNESDAY, DECEMBER 21, 1977

24

PLOT OF CDATE*STEM_D LEGEND: SYMBOL USED IS CHARACTER *
PLOT OF CDATE*CRAB_BUR LEGEND: SYMBOL USED IS CHARACTER O



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

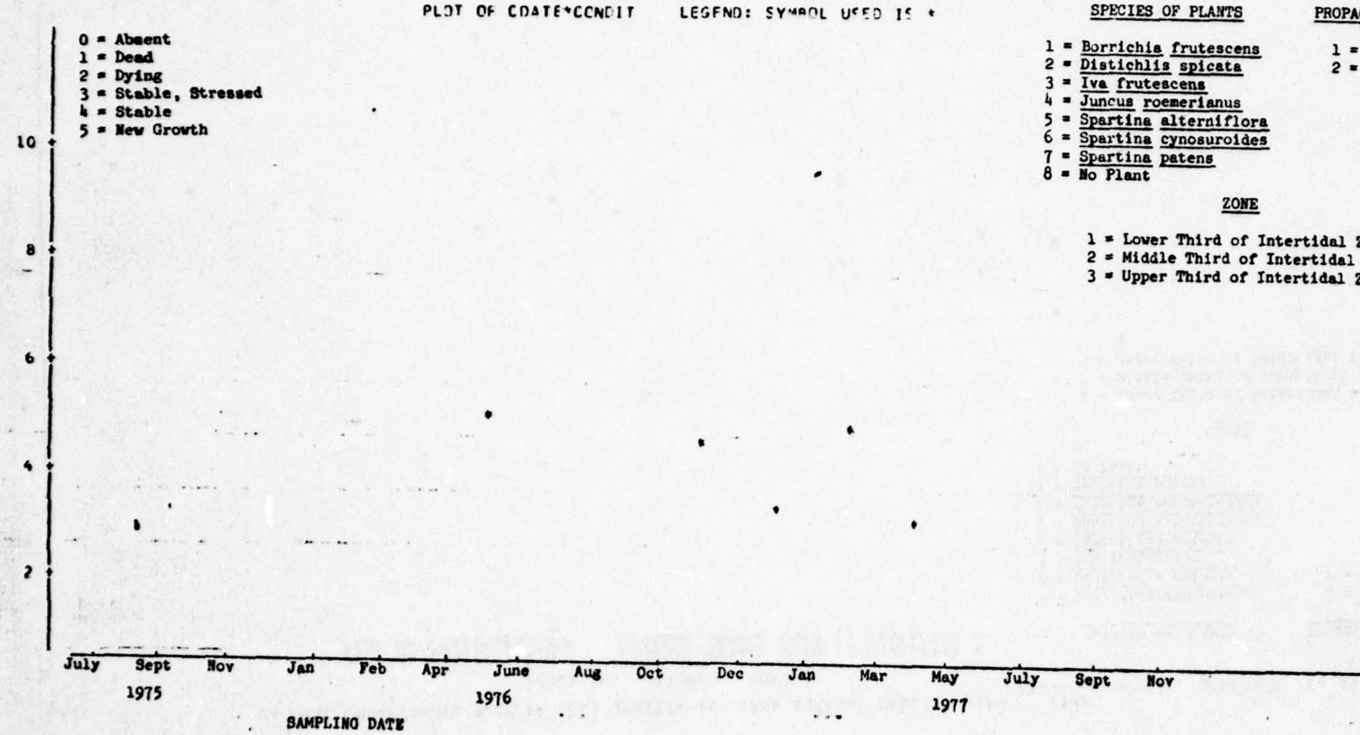
1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 1:19 THURSDAY, DECEMBER 22, 1977 25
SPECIES=5 PROP=2 ZONE=2

PLOT OF CDATE*CONDIT LEGEND: SYMBOL USED IS *



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

D91

NATURAL LOGARITHMIC PLOT IF CULM DENSITY AND CRAB BURROWS DENSITY WITH TIME

23:36 WEDNESDAY, DECEMBER 21, 1977 26

SPECIES=5 PROP=2 ZONE=2

PLOT OF CDATE*STEM_D LEGEND: SYMBOL USED IS CHARACTER *
PLOT OF CDATE*CRAB_BUR LEGEND: SYMBOL USED IS CHARACTER 0

SPECIES OF PLANTS

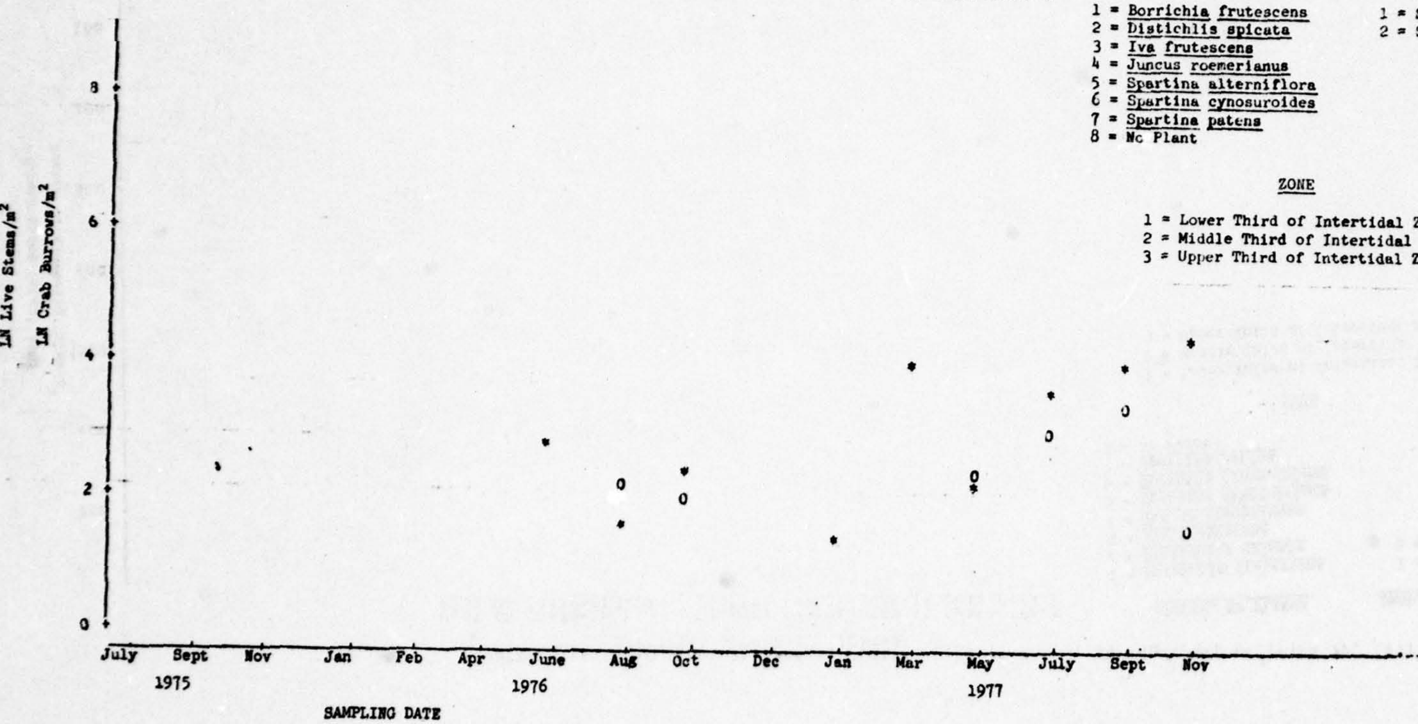
1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = Nc Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

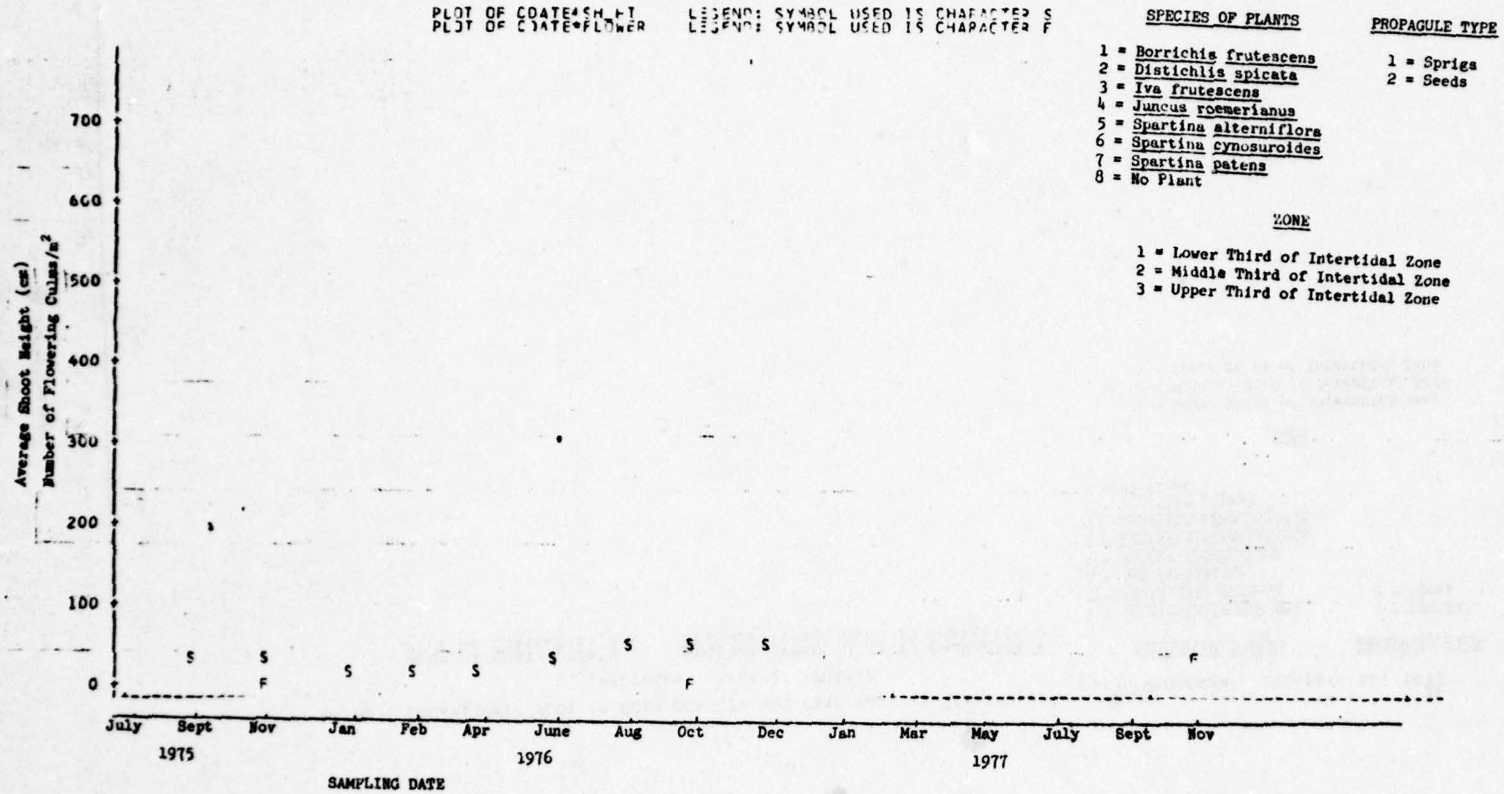
ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone



BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 1:19 THURSDAY, DECEMBER 22, 1977 52
SPECIES=5 PROP=1 ZONE=2

PLOT OF CDATE*SH_HT LEGEND: SYMBOL USED IS CHARACTER S
PLOT OF CDATE*FLOWER LEGEND: SYMBOL USED IS CHARACTER F



BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 1:19 THURSDAY, DECEMBER 22, 1977 54
SPECIES=5 PROP=2 ZONE=2

PLOT OF CDATE*SH_HT LEGEND: SYMBOL USED IS CHARACTER S
PLOT OF CDATE*FLOWER LEGEND: SYMBOL USED IS CHARACTER F

SPECIES OF PLANTS

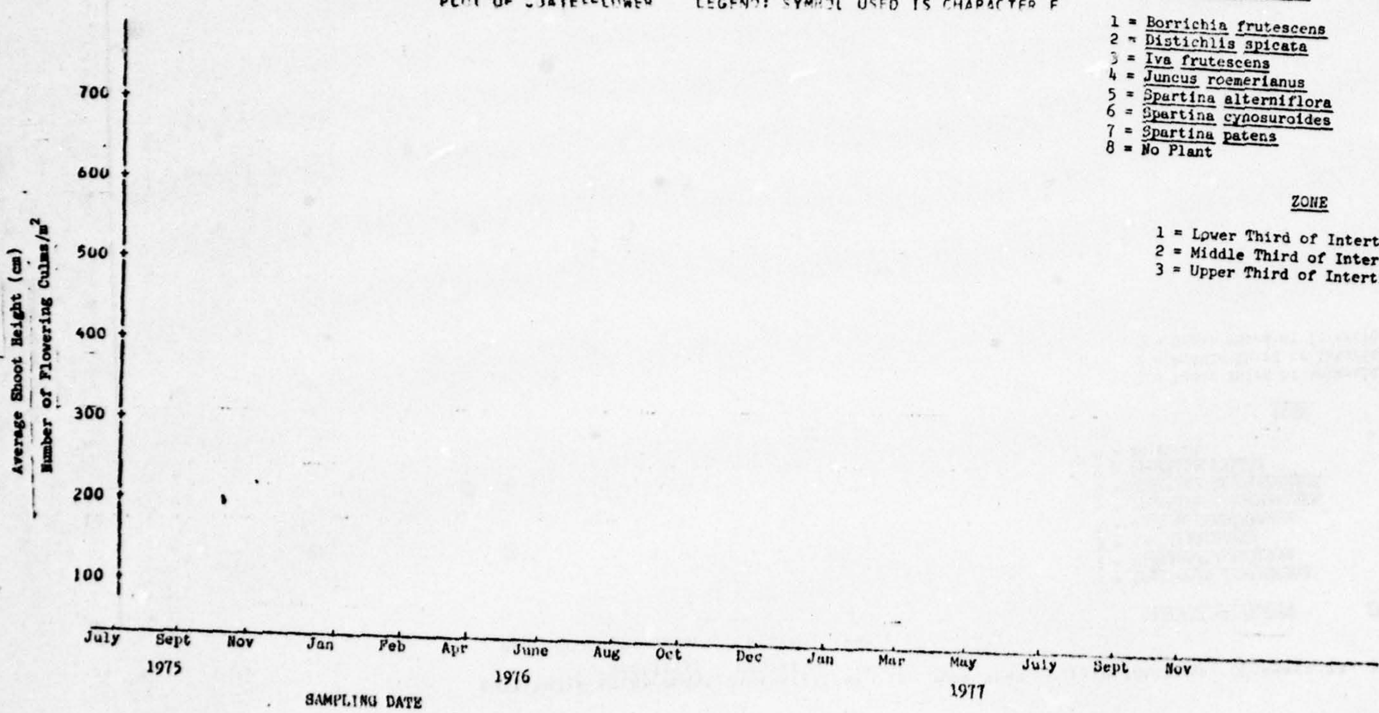
1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

ZONE

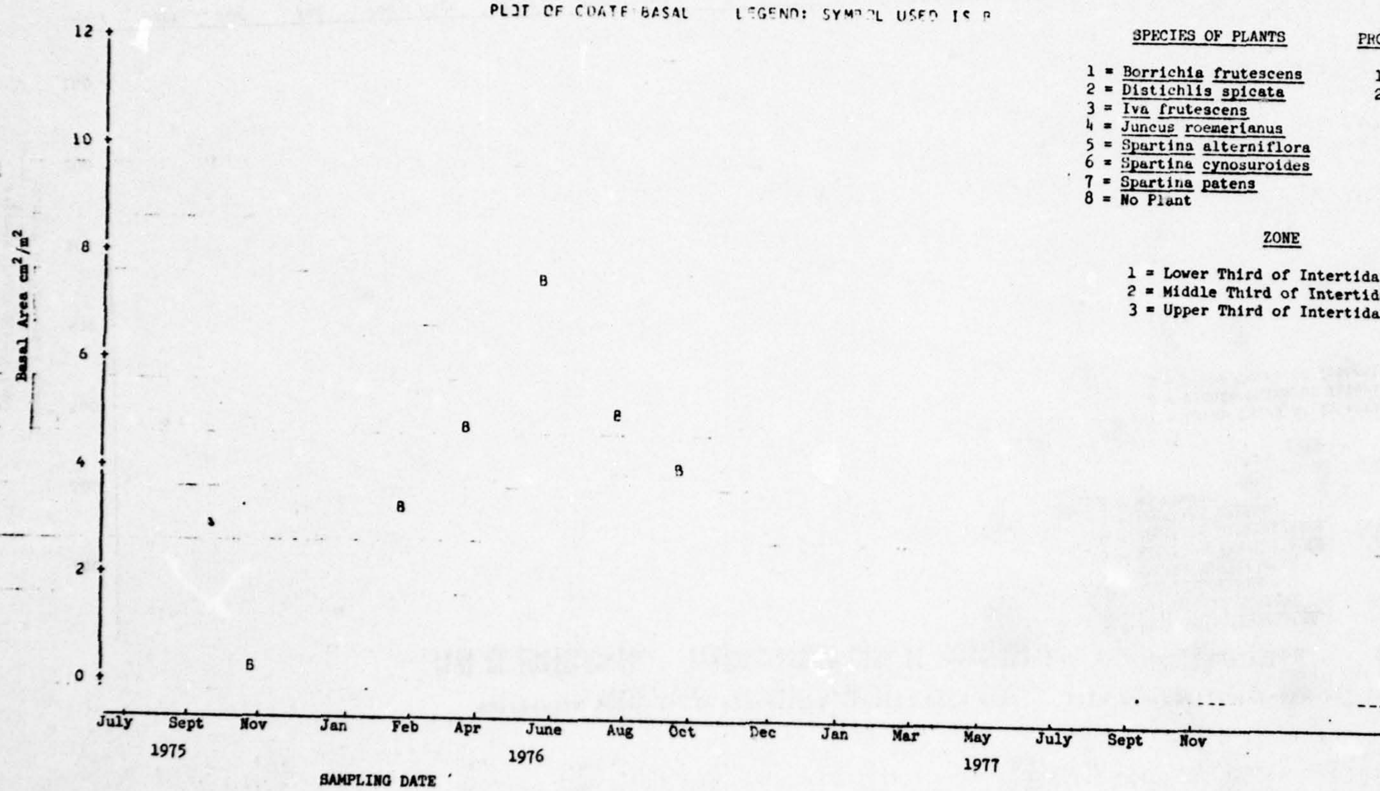
1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone



D93

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977 139
SPECIES=5   PROP=1   ZONE=2

PLOT OF CDATE*BASAL   LEGEND: SYMBOL USED IS B



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

ZONE

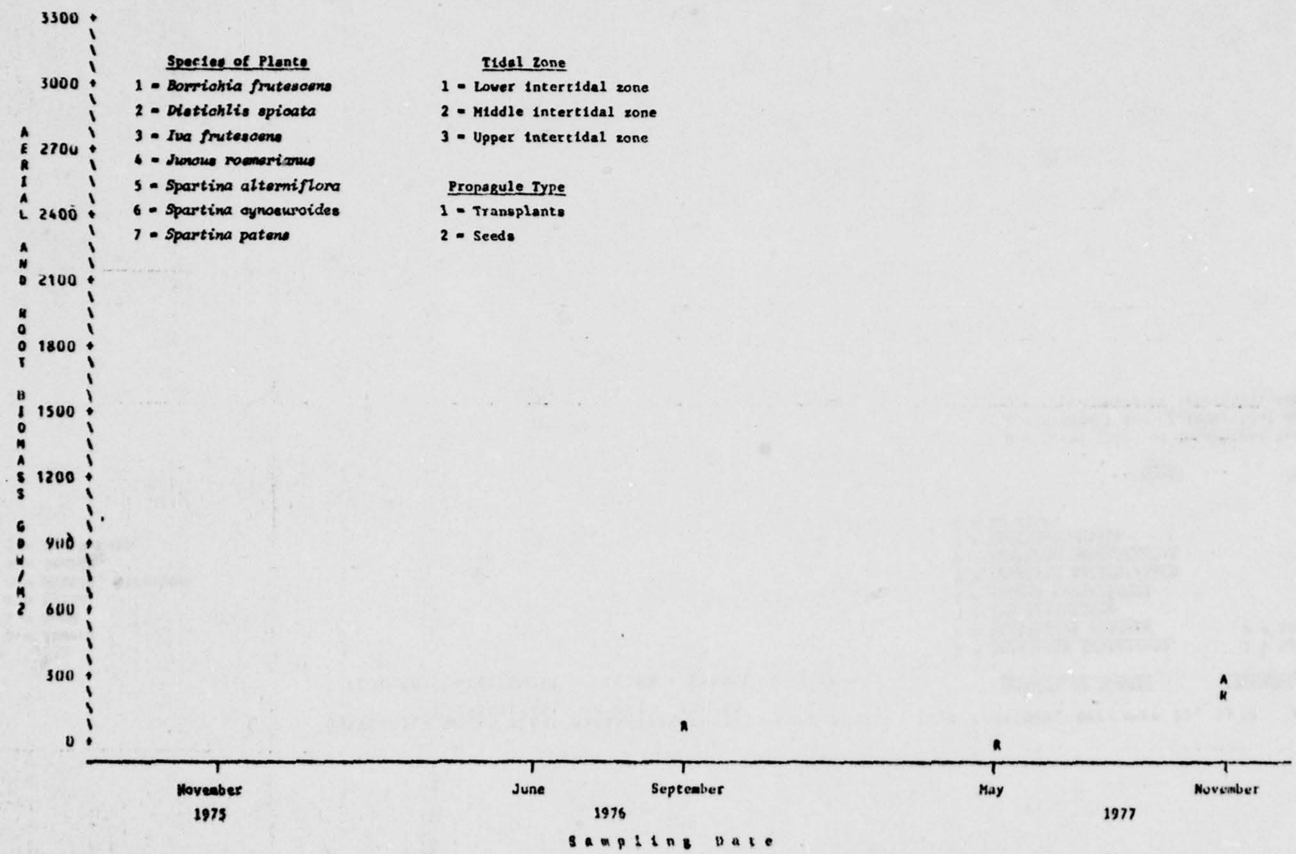
1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

D94

BUTTERMILK SOUND ROOT AND AERIAL BIOMASS BY SAMPLING DATE 17:35 THURSDAY, APRIL 13, 1978 20

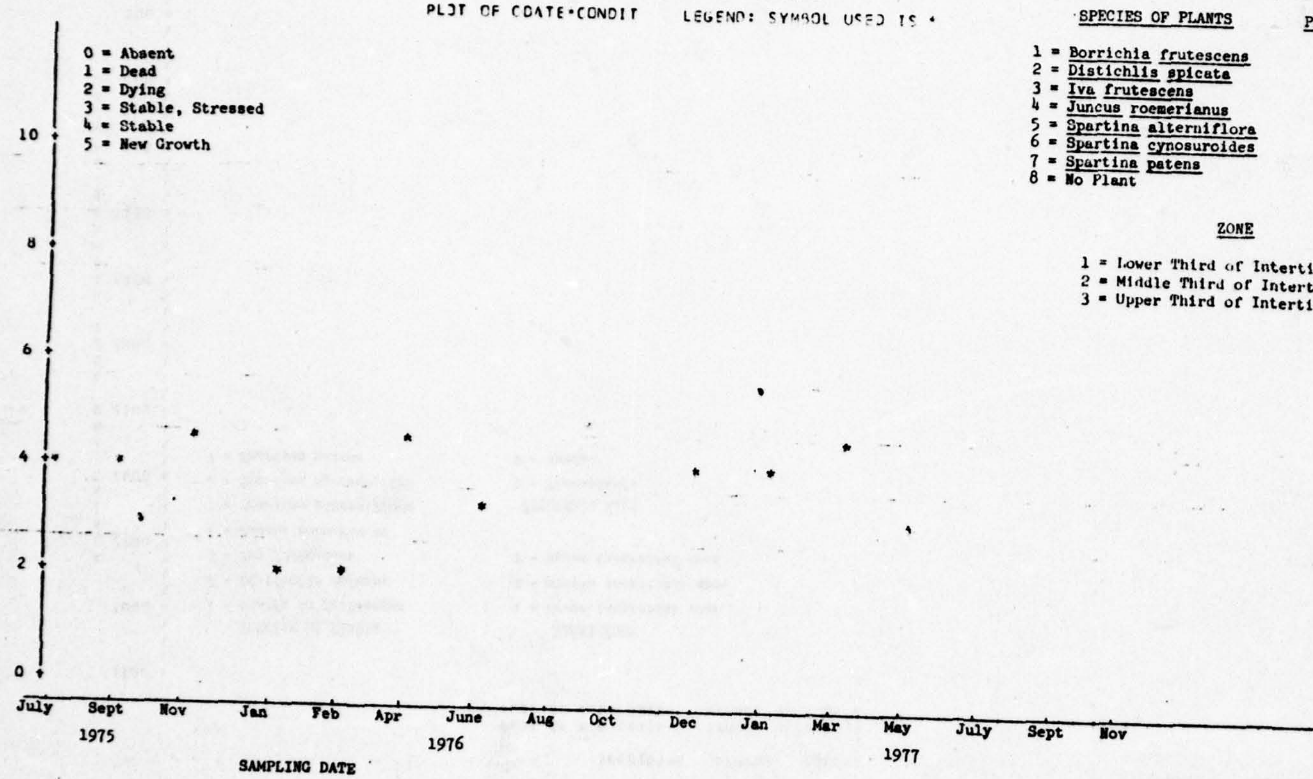
SPECIES=5 PROP=2 ZONE=2

PLOT OF MOM*CDATE SYMBOL USED IS R
PLOT OF AER*CDATE SYMBOL USED IS A



BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977   24
SPECIES=5   PROP=1   ZONE=3

PLOT OF CDATE*CONDIT   LEGEND: SYMBOL USED IS *



SPECIES OF PLANTS

1 = Borrichia frutescens
2 = Distichlis spicata
3 = Iva frutescens
4 = Juncus roemerianus
5 = Spartina alterniflora
6 = Spartina cynosuroides
7 = Spartina patens
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

ZONE

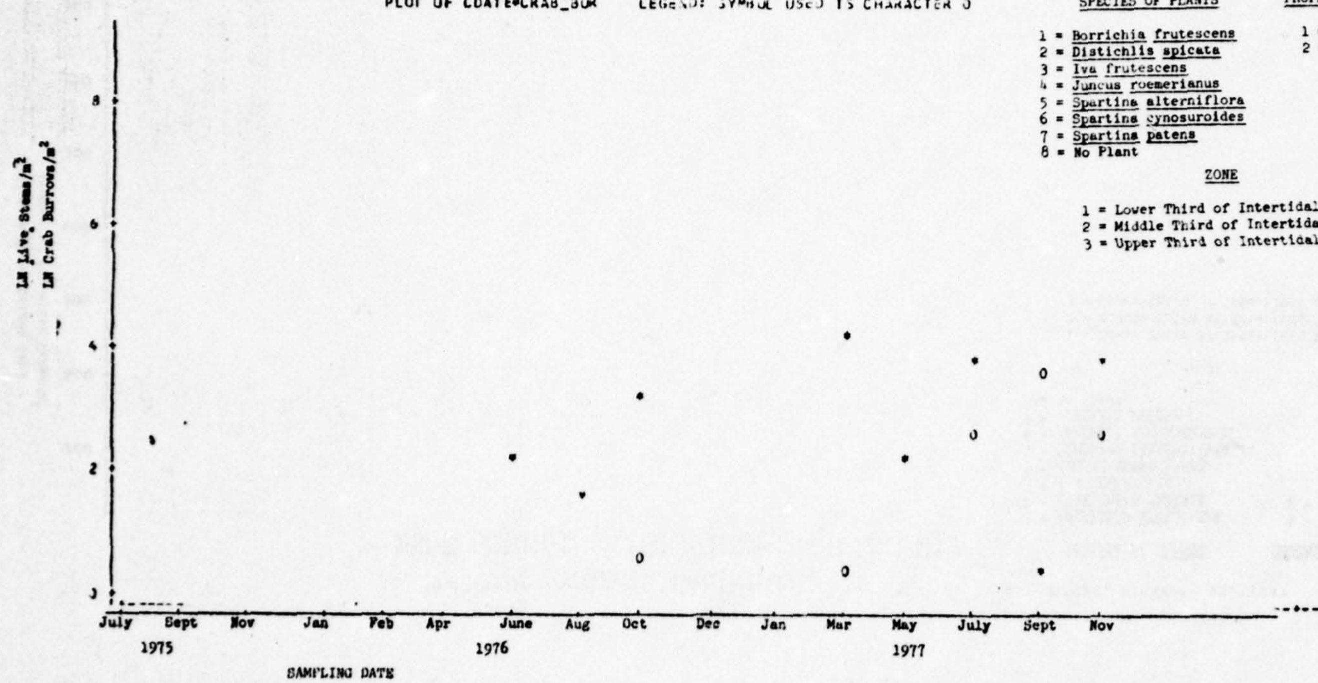
1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

NATURAL LOGARITHMIC PLOT IF CULM DENSITY AND CRAB BURROWS DENSITY WITH TIME

23:36 WEDNESDAY, DECEMBER 21, 1977 27

SPECIES=5 PROP=2 ZONE=3

PLOT OF CDATE*STEM_D LEGEND: SYMBOL USED IS CHARACTER *
PLOT OF CDATE*CRAB_BUR LEGEND: SYMBOL USED IS CHARACTER O



SPECIES OF PLANTS

1 = Borrichia frutescens
2 = Distichlis spicata
3 = Iva frutescens
4 = Juncus roemerianus
5 = Spartina alterniflora
6 = Spartina cynosuroides
7 = Spartina patens
8 = No Plant

PROPAGULE TYPE

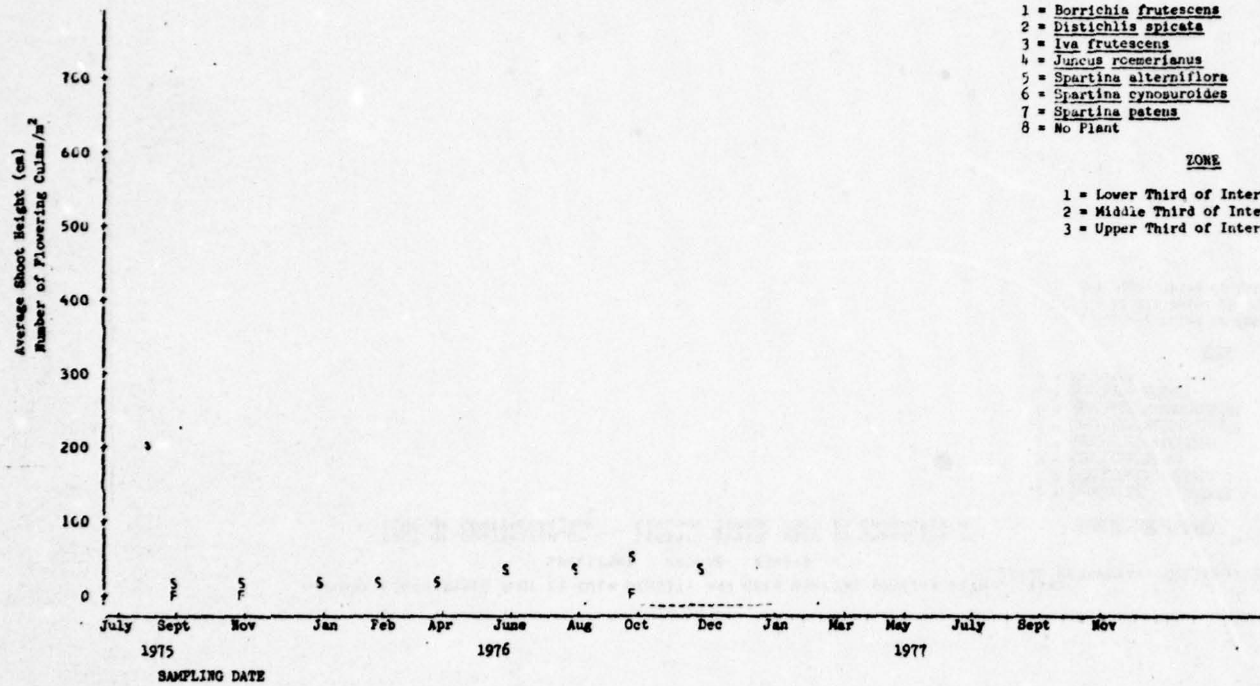
1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 1:19 THURSDAY, DECEMBER 22, 1977 63
SPECIES=5 PROP=1 ZONE=3

PLOT OF CDATE*SH_HT LEGEND: SYMBOL USED IS CHARACTER S
PLOT OF CDATE*FLOWER LEGEND: SYMBOL USED IS CHARACTER F



SPECIES OF PLANTS

1 = Borrichia frutescens
2 = Distichlis spicata
3 = Iva frutescens
4 = Juncus roemerianus
5 = Spartina alterniflora
6 = Spartina cynosuroides
7 = Spartina patens
8 = No Plant

PROPAGULE TYPE

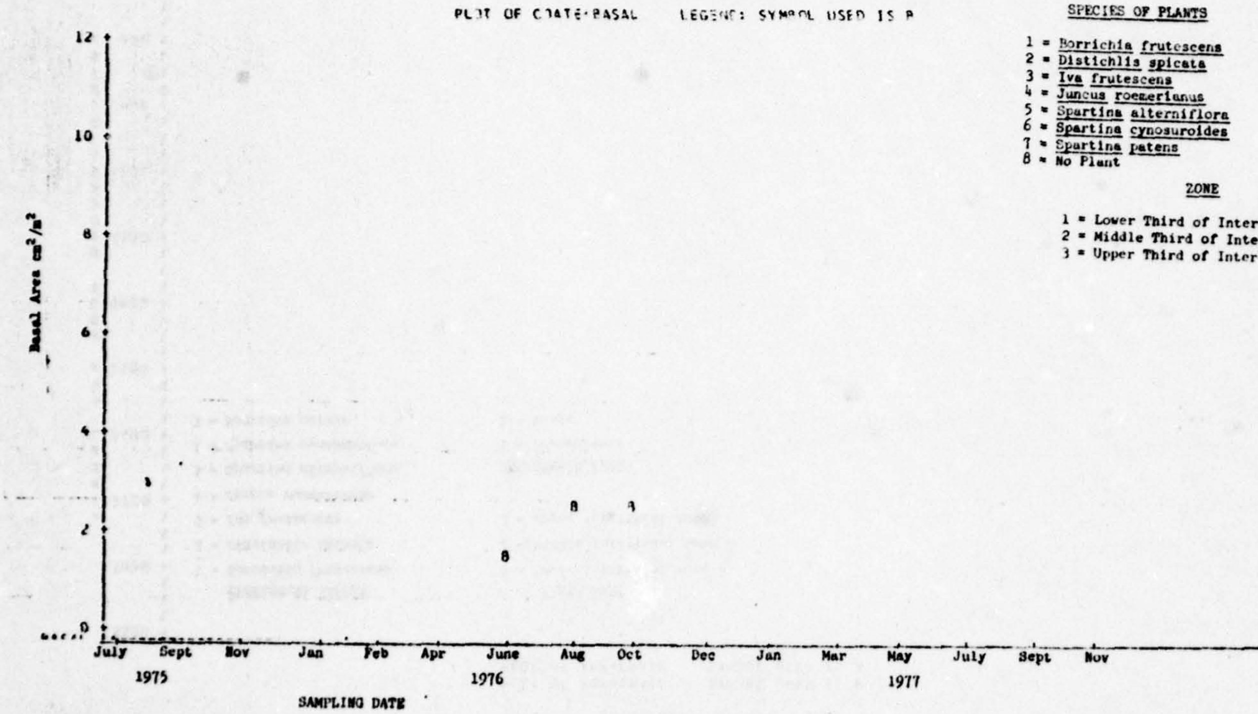
1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:15 THURSDAY, DECEMBER 22, 1977 142
SPECIES=5   PROP=2   ZONE=3

PLOT OF C*DATE*BASAL   LEGEND: SYMBOL USED IS 8



SPECIES OF PLANTS

1 = Borrichia frutescens
2 = Distichlis spicata
3 = Iva frutescens
4 = Juncus roemerianus
5 = Spartina alterniflora
6 = Spartina cynosuroides
7 = Spartina patens
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

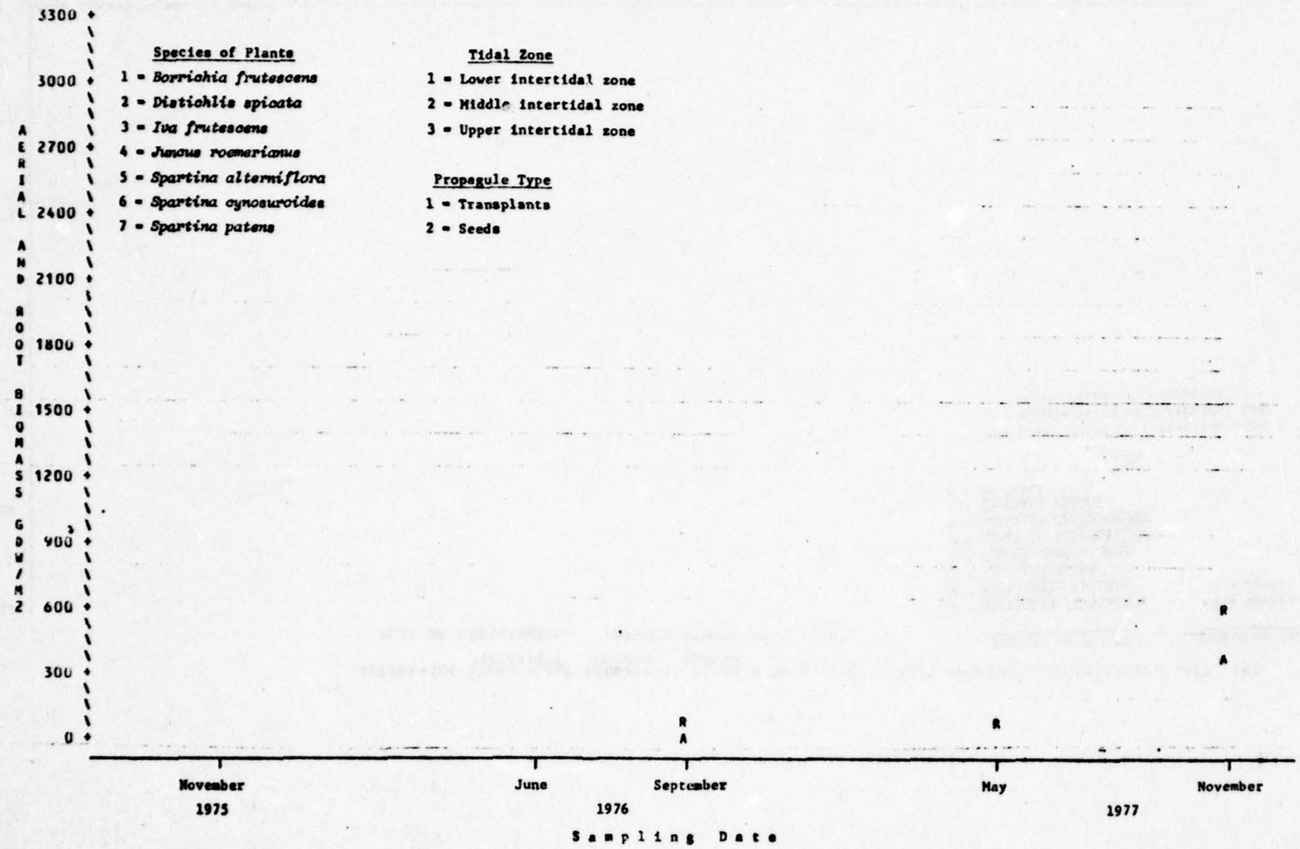
ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

BUTTERMILK SOUND ROOT AND AERIAL BIOMASS BY SAMPLING DATE

SPECIES=5 PROP=2 ZONE=3

PLOT OF MOP*CDATE SYMBOL USED IS P
PLOT OF AER*CDATE SYMBOL USED IS A



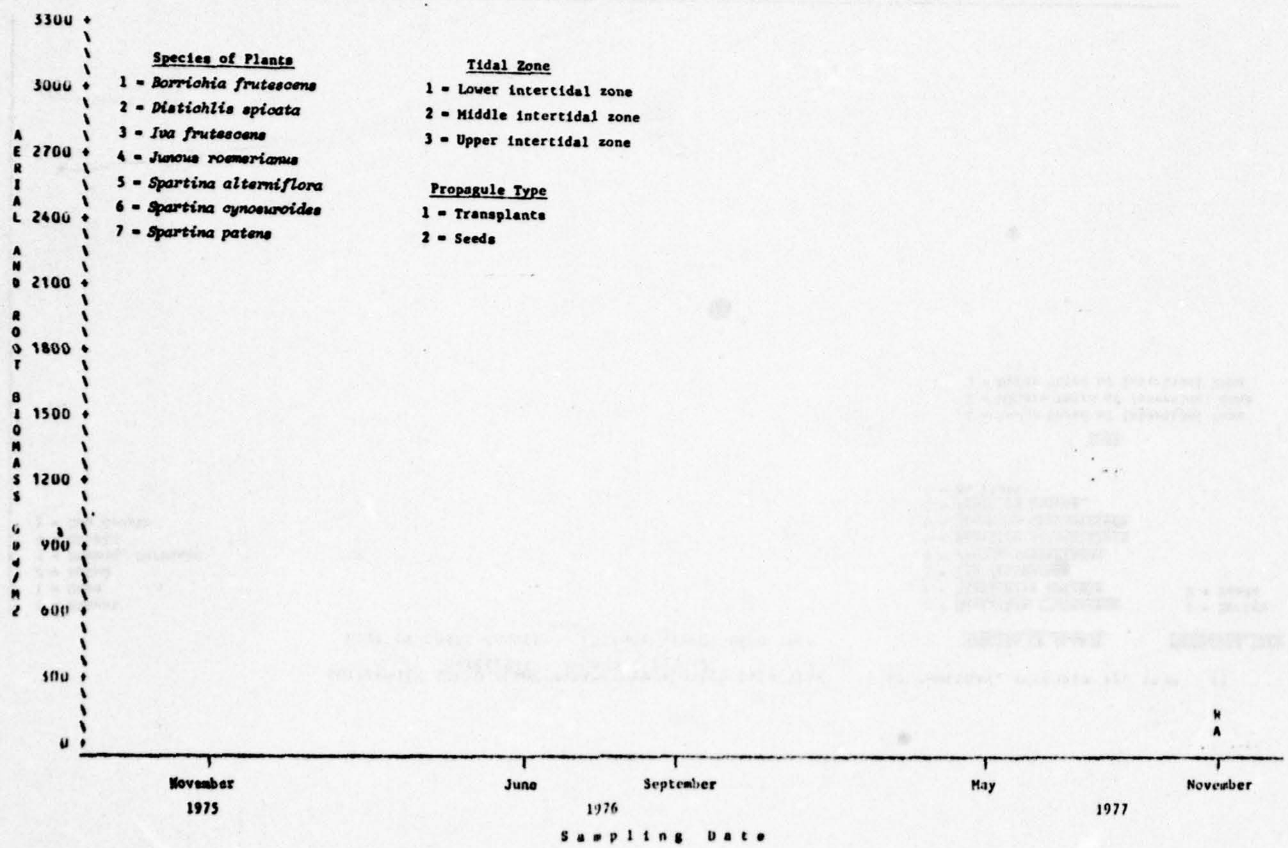
D100

BUTTERMILK SOUND ROOT AND AERIAL BIOMASS BY SAMPLING DATE

17:35 THURSDAY, APRIL 13, 1978 22

SPECIES=5 PROP=3 ZONE=2

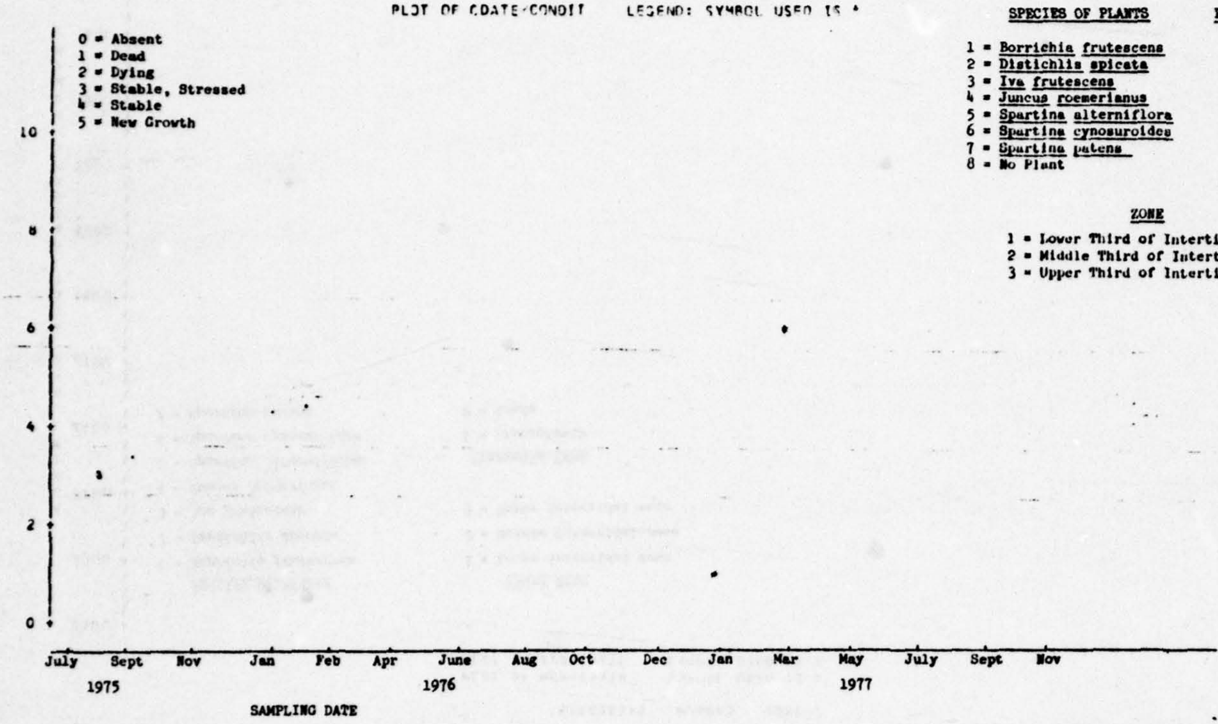
PLOT OF MOM*CDATE SYMBOL USED IS M
PLOT OF AER*CDATE SYMBOL USED IS A



D101

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:1? THURSDAY, DECEMBER 22, 1977   21
SPECIES=4   PROP=2   ZONE=2

PLOT OF CDATE*CONDIT   LEGEND: SYMBOL USED IS *



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

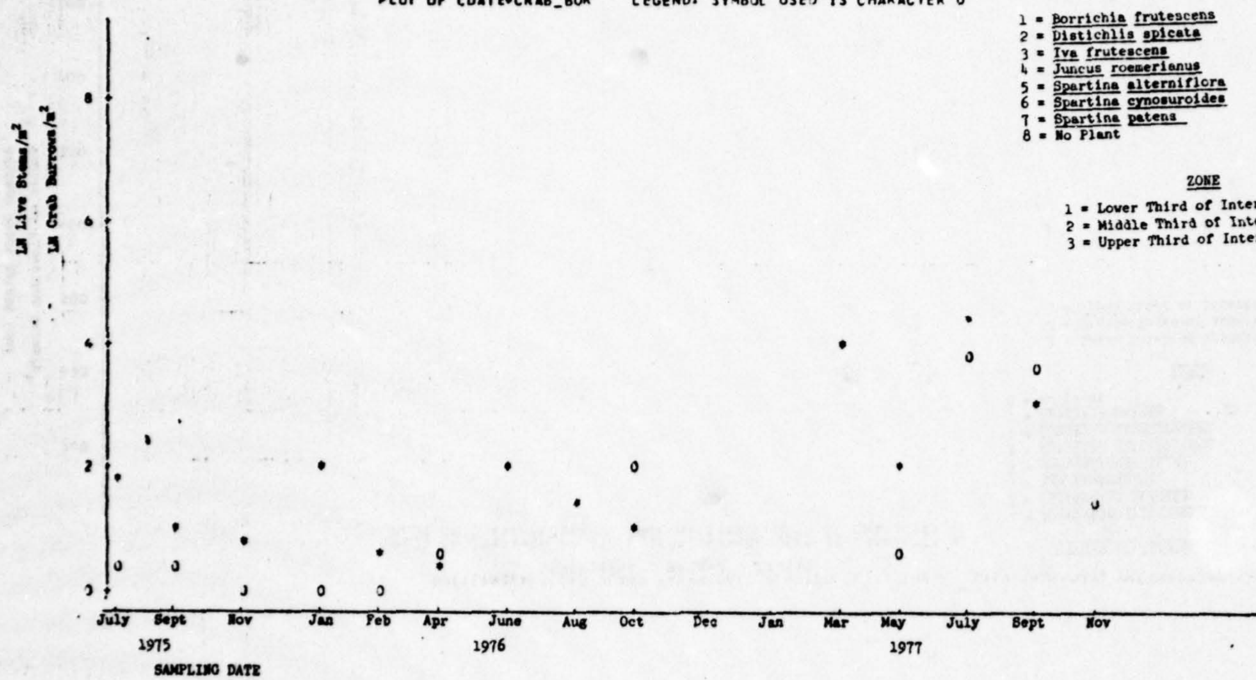
D102

NATURAL LOGARITHMIC PLOT IF CULM DENSITY AND CRAB BURROWS DENSITY WITH TIME

23:36 WEDNESDAY, DECEMBER 21, 1977 28

SPECIES=6 PROP=1 ZONE=2

PLOT OF CDATE*STEM_D LEGEND: SYMBOL USED IS CHARACTER *
PLOT OF CDATE*CRAB_BUR LEGEND: SYMBOL USED IS CHARACTER 0



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

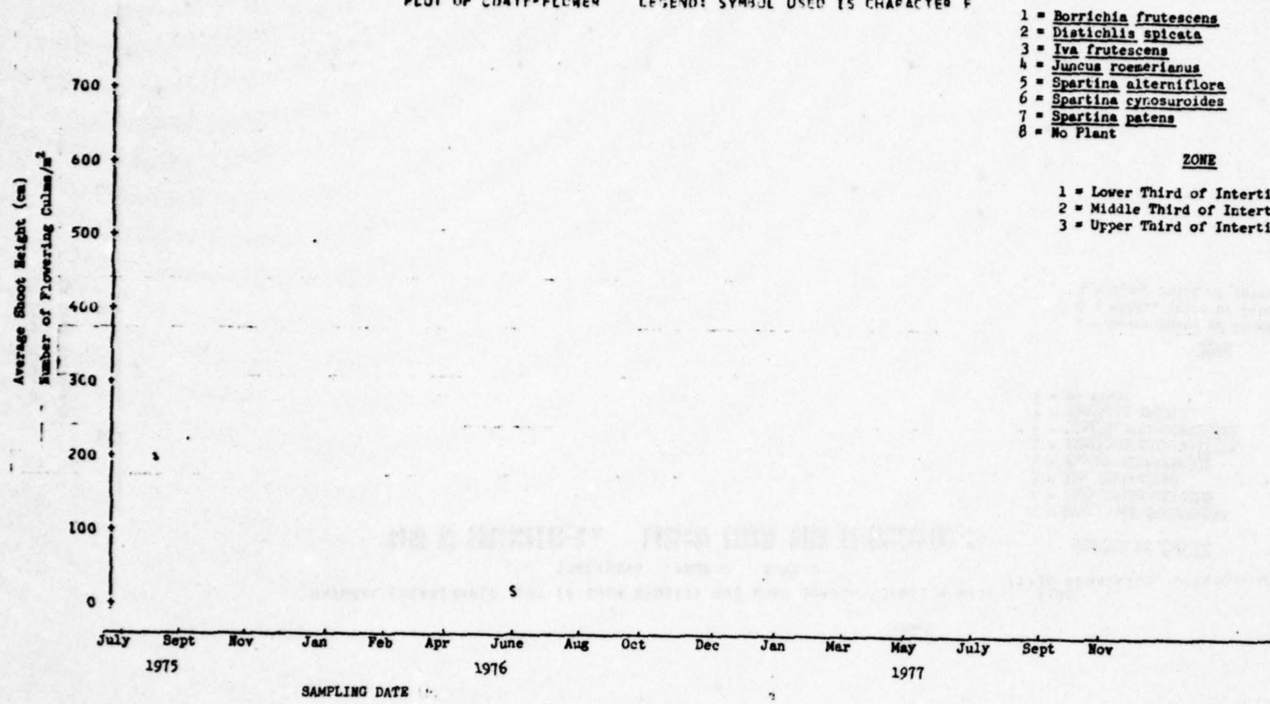
1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 1:19 THURSDAY, DECEMBER 22, 1977 50
SPECIES=4 PROP=2 ZONE=2

PLOT OF CDATE*SH_HT LEGEND: SYMBOL USED IS CHARACTER S
PLOT OF CDATE*FLOWER LEGEND: SYMBOL USED IS CHARACTER F



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

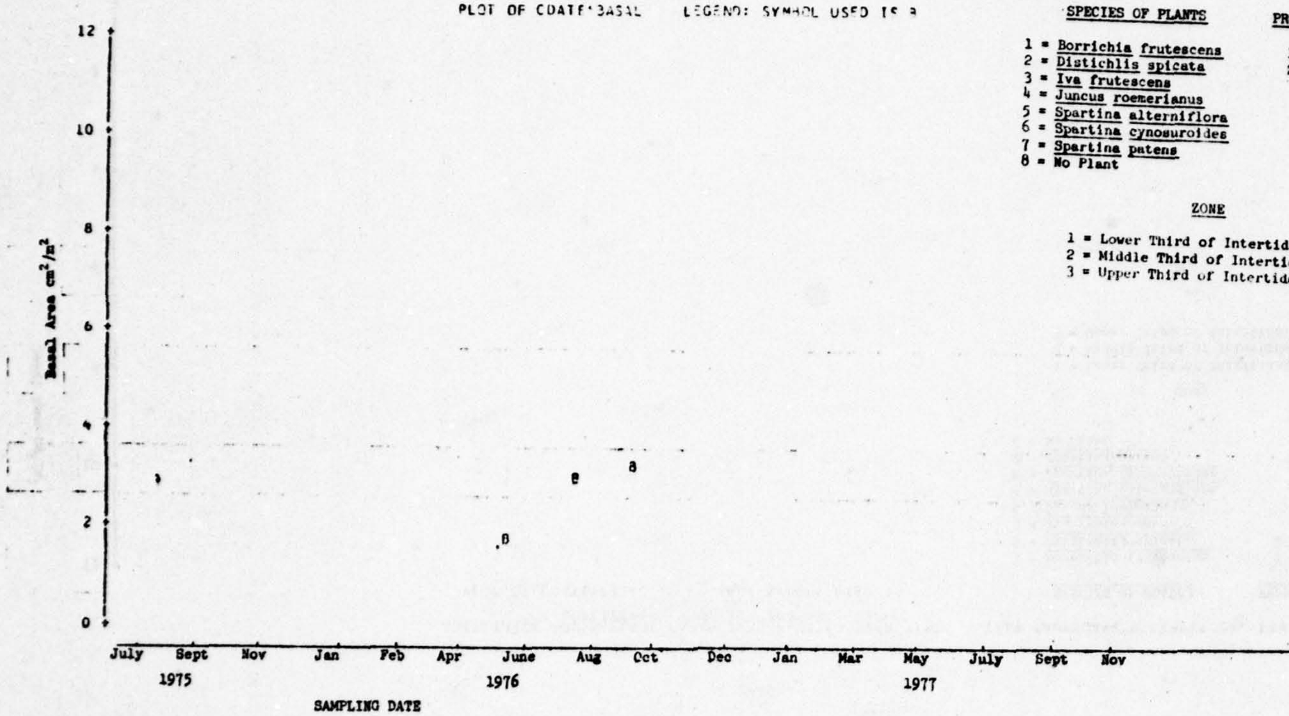
ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

D104

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977   141
SPECIES=5   PROP=2   ZONE=2

PLOT OF CDATE*BASAL   LEGEND: SYMBOL USED IS 8



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

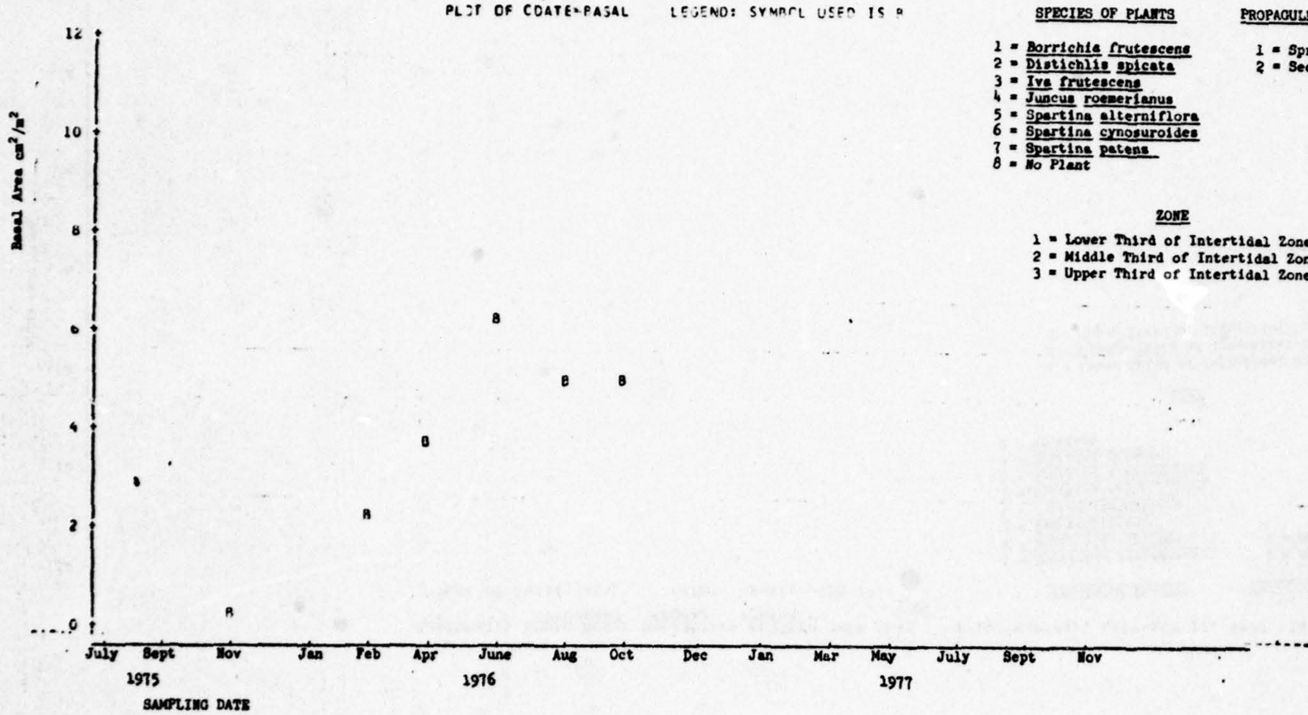
1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 1:19 THURSDAY, DECEMBER 22, 1977 144
SPECIES=6 PROP=1 ZONE=2

PLOT OF CDATE*BASAL LEGEND: SYMBOL USED IS B



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = *No Plant*

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

ZONE

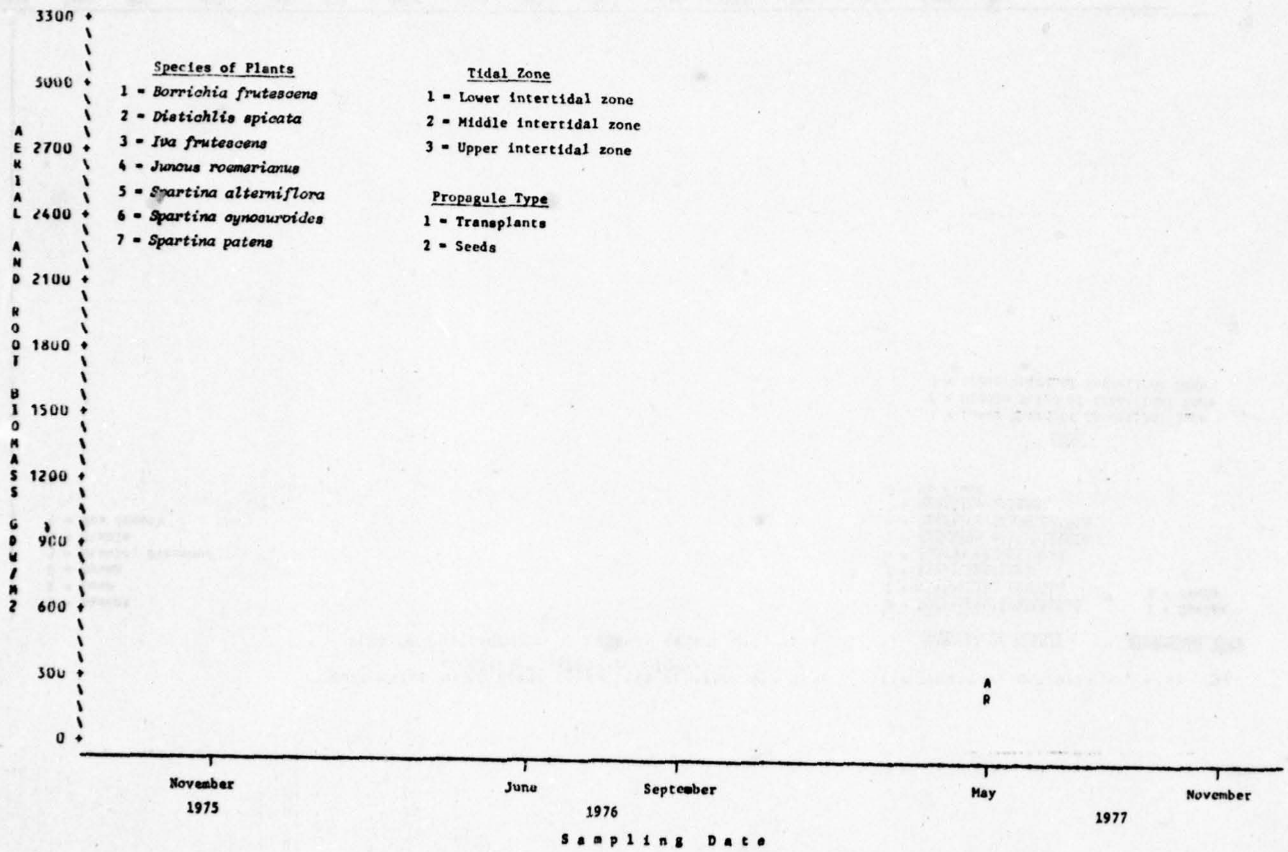
1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

BUTTERMILK SOUND ROOT AND AERIAL BIOMASS BY SAMPLING DATE

17:35 THURSDAY, APRIL 13, 1978

SPECIES=6 PROP=1 ZONE=2

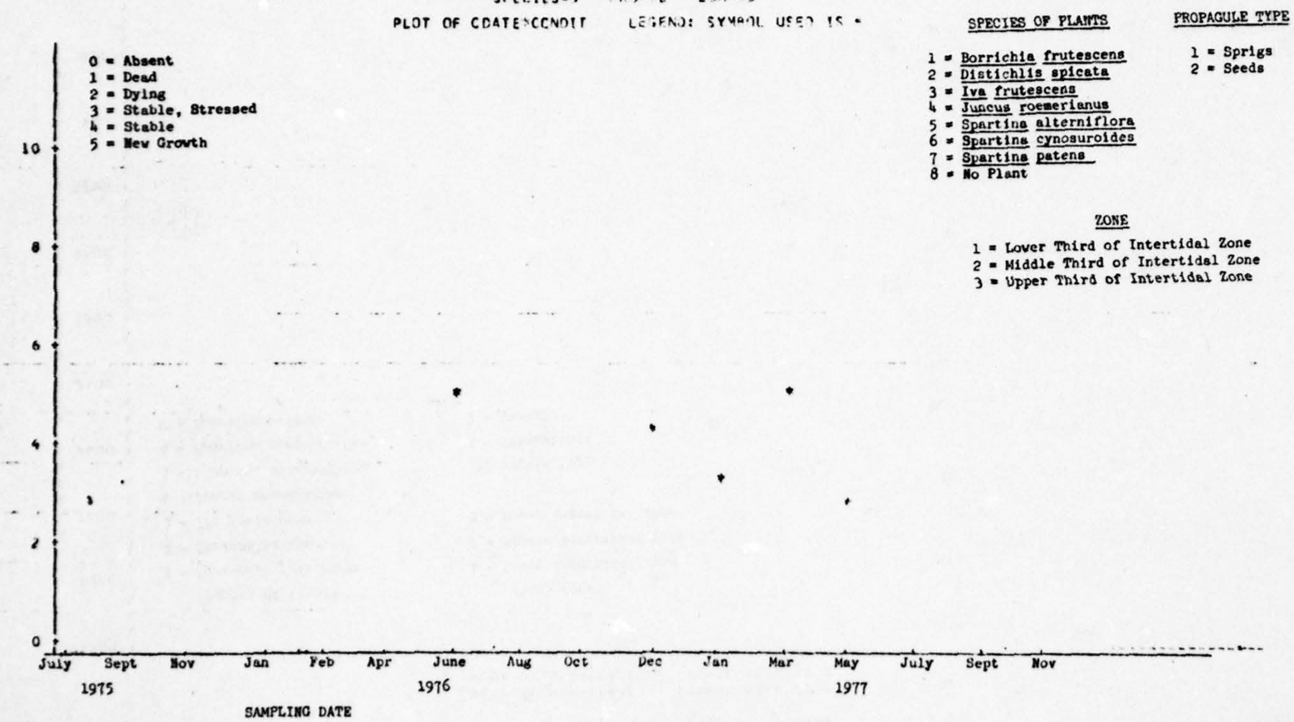
PLOT OF ROM*CDATE SYMBOL USED IS R
PLOT OF AER*CDATE SYMBOL USED IS A



D107

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 1:19 THURSDAY, DECEMBER 22, 1977 26
SPECIES=5 PROP=2 ZONE=3

PLOT OF CDATE*CONDIT LEGEND: SYMBOL USED IS *



NATURAL LOGARITHMIC PLOT IF CULM DENSITY AND CRAB BURROWS DENSITY WITH TIME

23:36 WEDNESDAY, DECEMBER 21, 1977 29

SPECIES=6 PROP=1 ZONE=3

PLOT OF CDATE*STEM_D LEGEND: SYMBOL USED IS CHARACTER *
PLOT OF CDATE*CRAB_BUR LEGEND: SYMBOL USED IS CHARACTER 0

SPECIES OF PLANTS

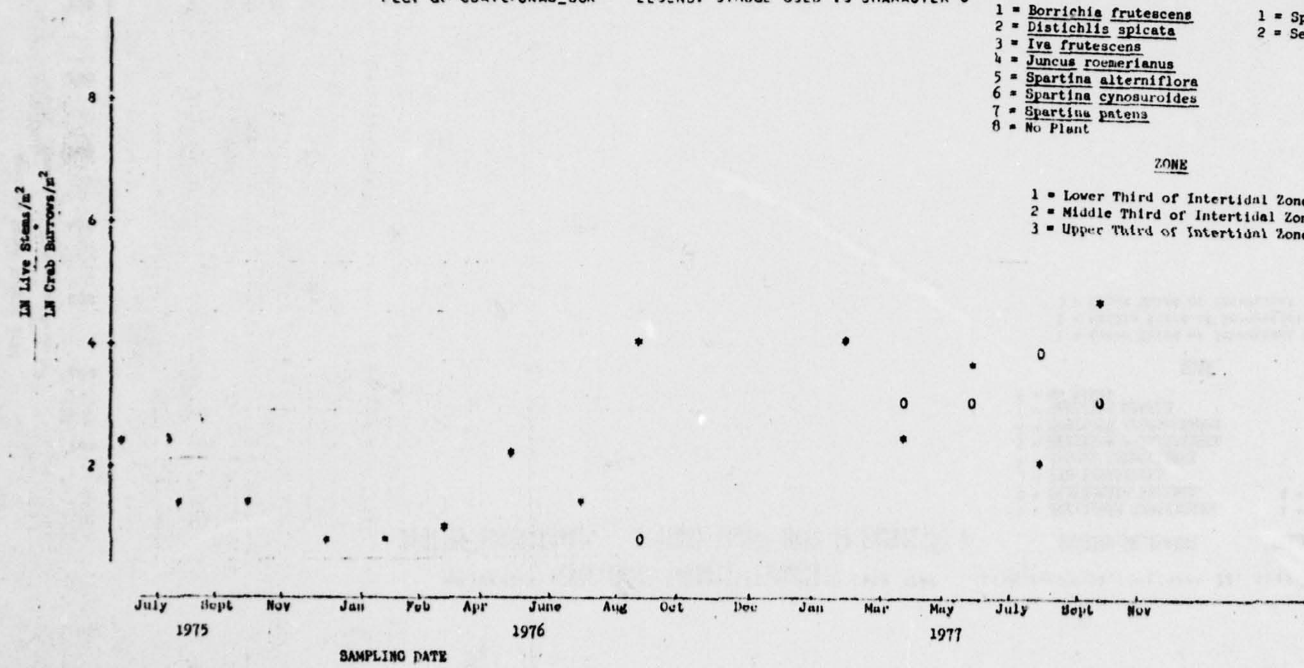
1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

ZONE

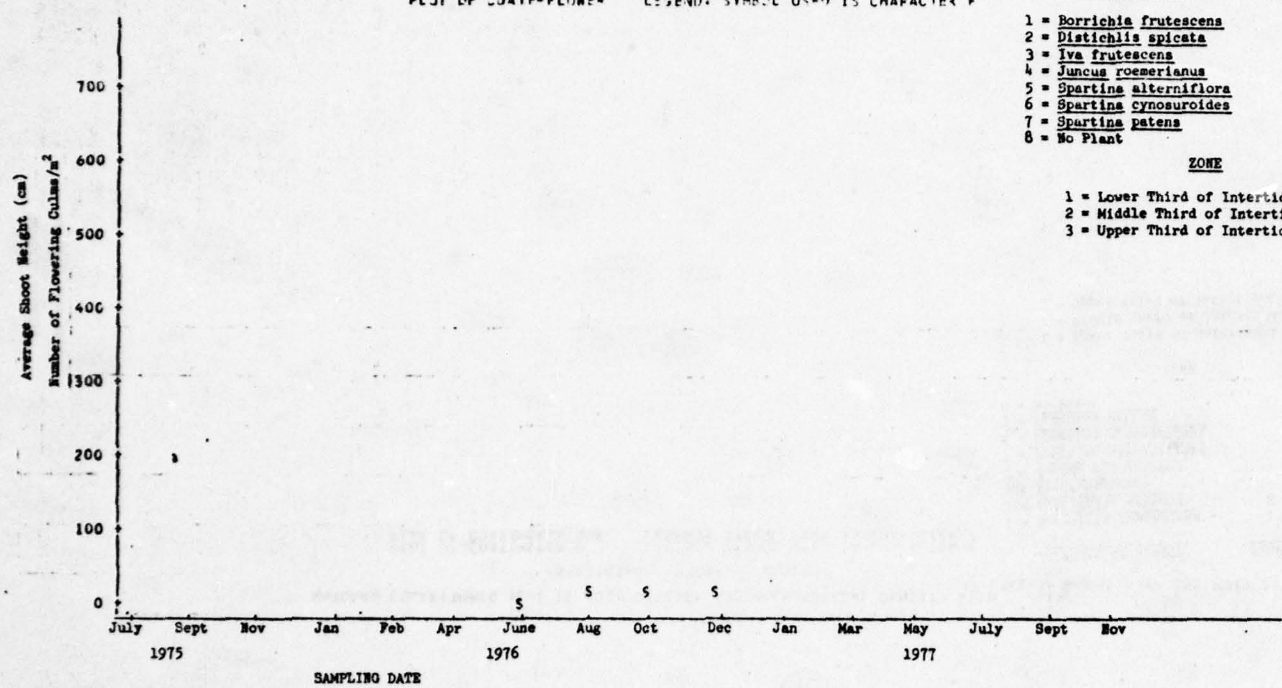
1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone



D109

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977   55
SPECIES=5   PROP=2   ZONE=3

PLOT OF CDATE*SH_HT   LEGEND: SYMBOL USED IS CHARACTER S
PLOT OF CDATE*FLOWER   LEGEND: SYMBOL USED IS CHARACTER F



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

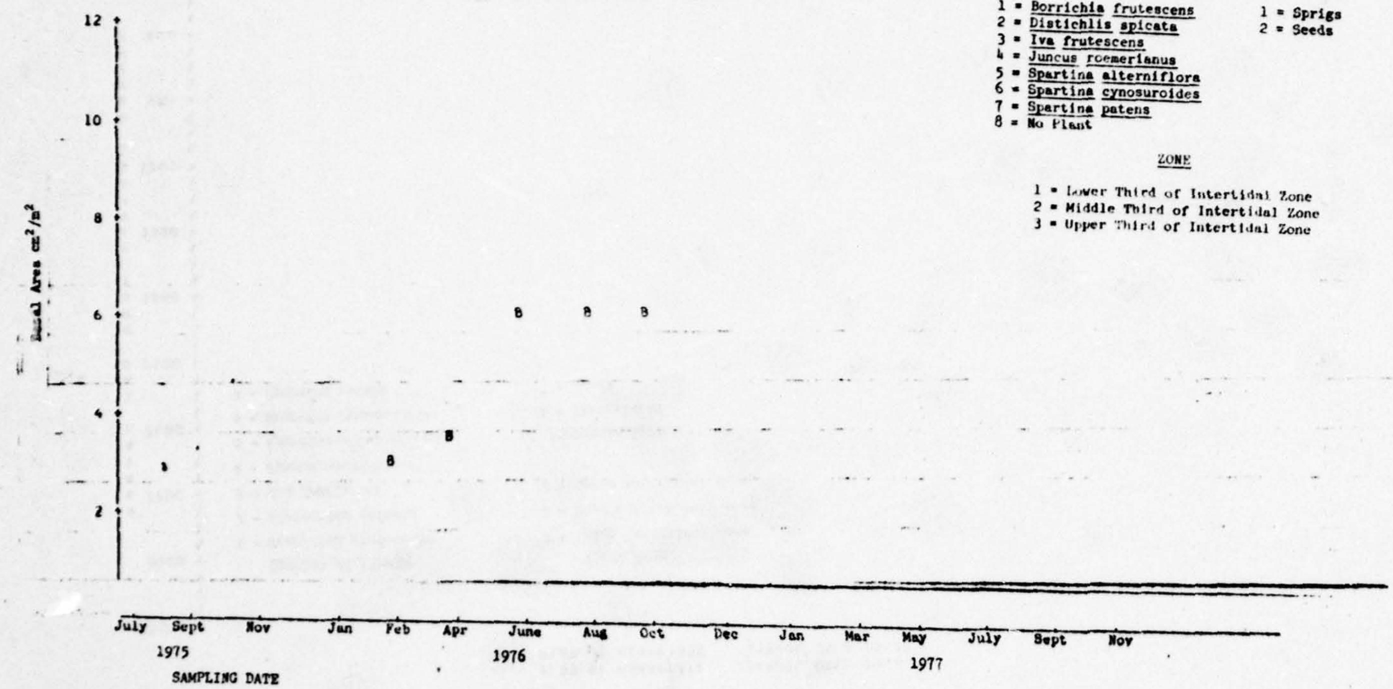
ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

D110

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 1:19 THURSDAY, DECEMBER 22, 1977 145
SPECIES=6 PROP=1 ZONE=3

PLOT OF CDATE*BASAL LEGEND: SYMBOL USED IS P



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

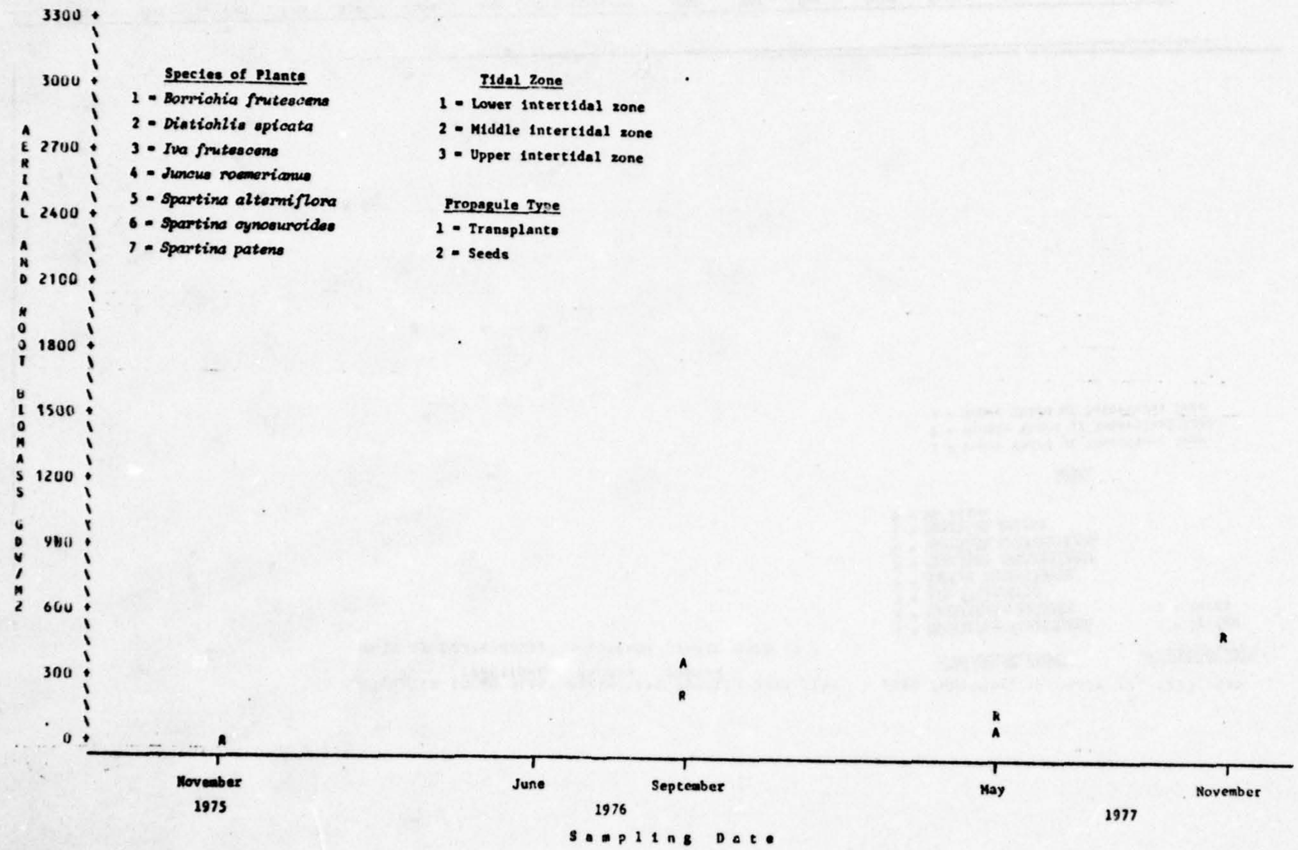
D111

BUTTERMILK SOUND ROOT AND AERIAL BIOMASS BY SAMPLING DATE

17:35 THURSDAY, APRIL 13, 1978

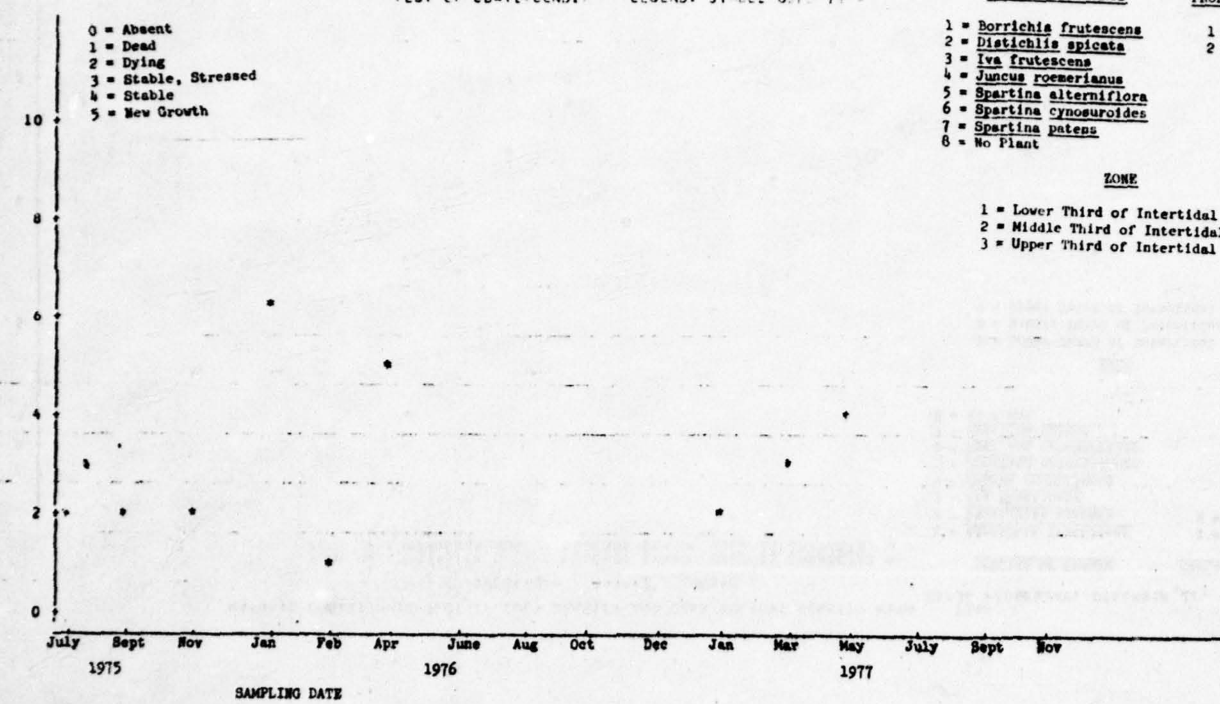
SPECIES=6 PROP=1 ZONE=3

PLOT OF ROM*CDATE SYMBOL USED IS R
PLOT OF AER*CDATE SYMBOL USED IS A



BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977   28
SPECIES=6   PROP=1   ZONE=2

PLOT OF CDATE*CONDIT   LEGEND: SYMBOL USED IS *



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

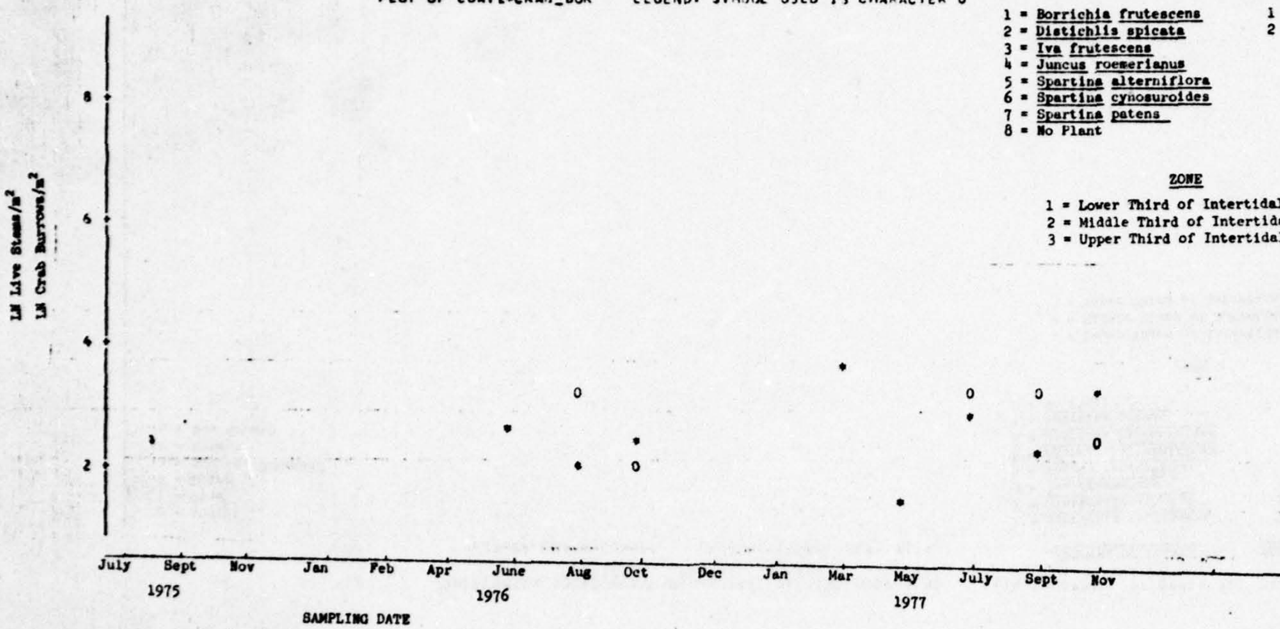
ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

NATURAL LOGARITHMIC PLOT IF CULM DENSITY AND CRAB BURROWS DENSITY WITH TIME 23:36 WEDNESDAY, DECEMBER 21, 1977 30

SPECIES=6 PROP=2 ZONE=2

PLOT OF CDATE*STEM_D LEGEND: SYMBOL USED IS CHARACTER *
PLOT OF CDATE*CRAB_BUR LEGEND: SYMBOL USED IS CHARACTER O



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

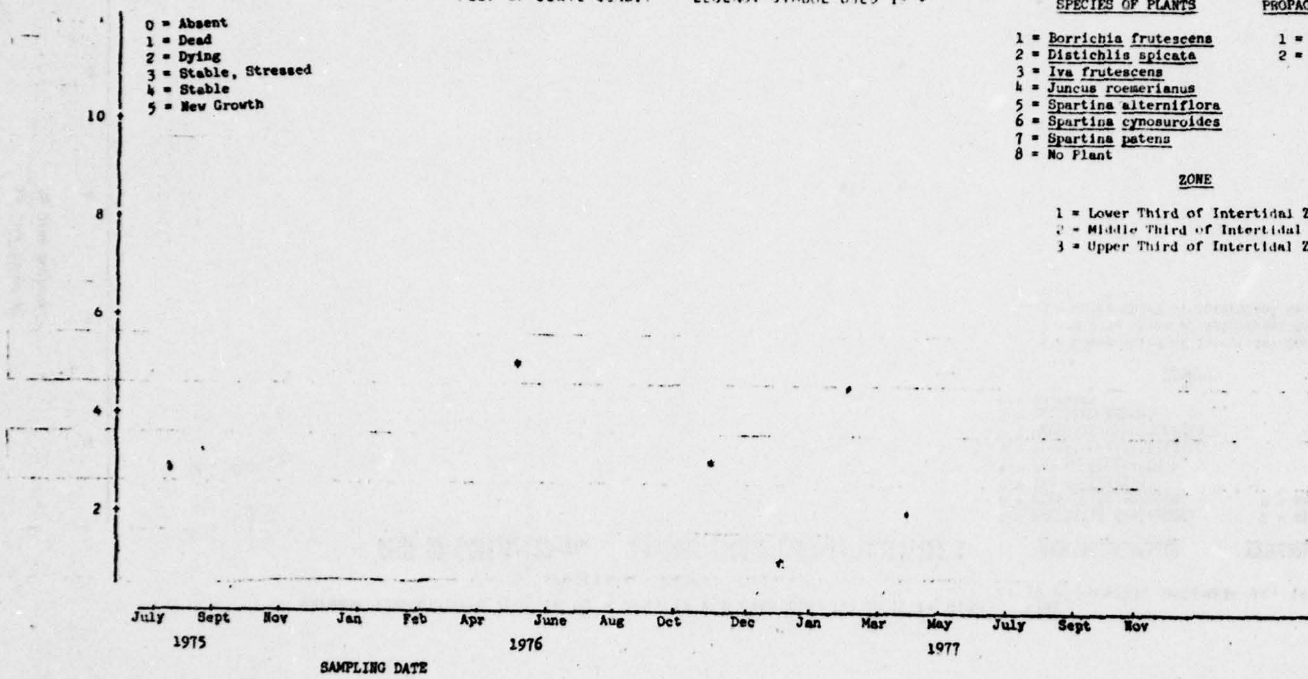
ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

D114

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977   30
SPECIES=6   PROP=2   ZONE=2

PLOT OF CDATE*CONDIT   LEGEND: SYMBOL USED IS *



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

ZONE

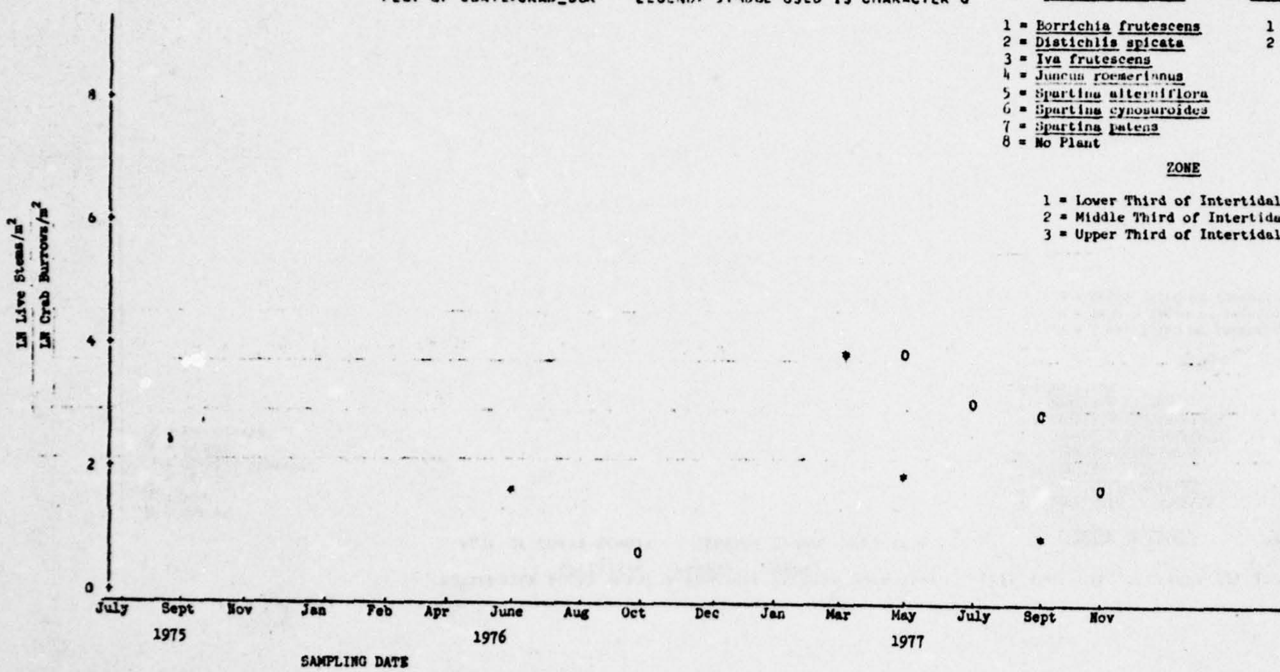
1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

NATURAL LOGARITHMIC PLOT IF CULM DENSITY AND CRAB BURROWS DENSITY WITH TIME

23:16 WEDNESDAY, DECEMBER 21, 1977 34

SPECIES=7 PROP=2 ZONE=2

PLOT OF CDATE*STEM_D LEGEND: SYMBOL USED IS CHARACTER *
PLOT OF CDATE*CRAB_BUR LEGEND: SYMBOL USED IS CHARACTER O



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

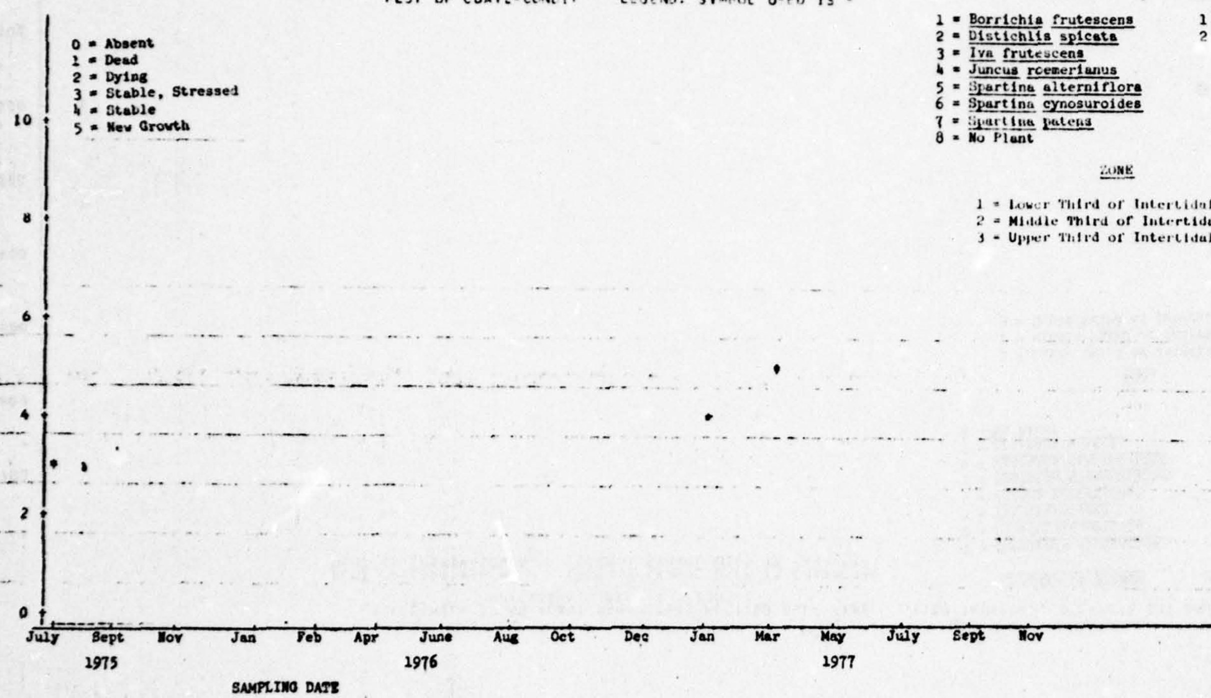
1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977   34
SPECIES=7   PROP=2   ZONE=2

PLOT OF CDATE*CONDIT   LEGEND: SYMBOL USED IS *



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

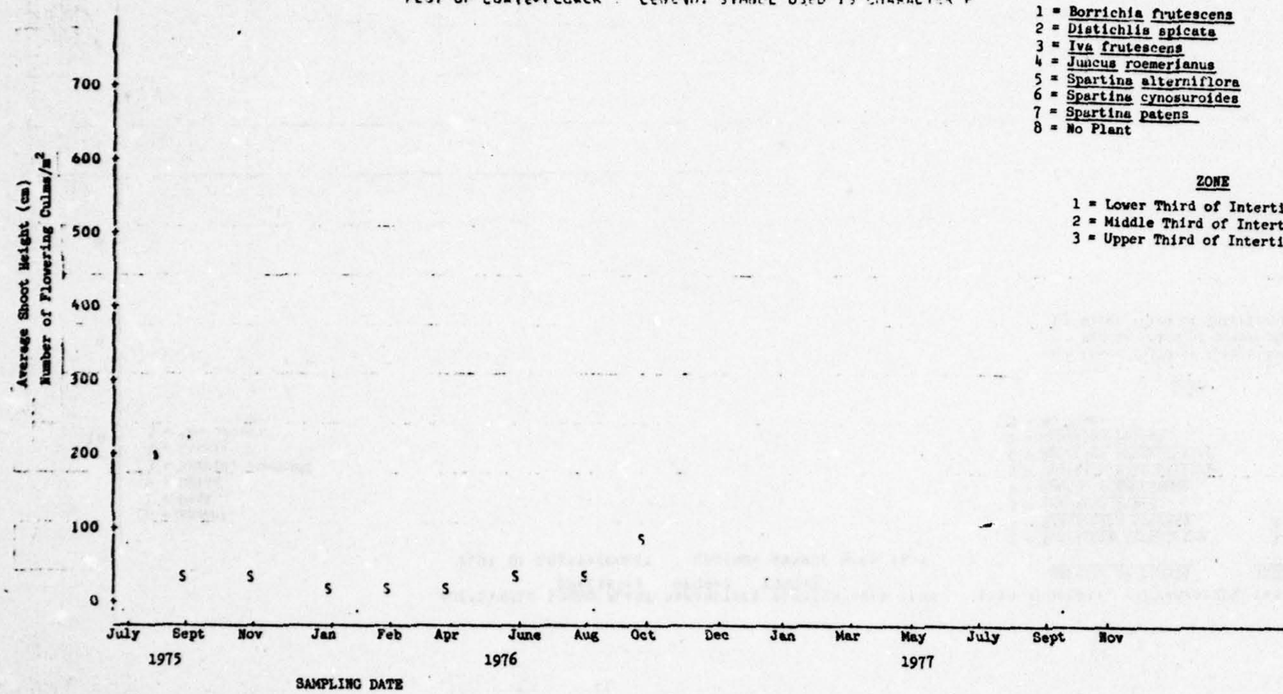
1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977   57
SPECIES=6   PROP=1   ZONE=2

PLOT OF CDATE*SH_HT   LEGEND: SYMBOL USED IS CHARACTER S
PLOT OF CDATE*FLOWER   LEGEND: SYMBOL USED IS CHARACTER F



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

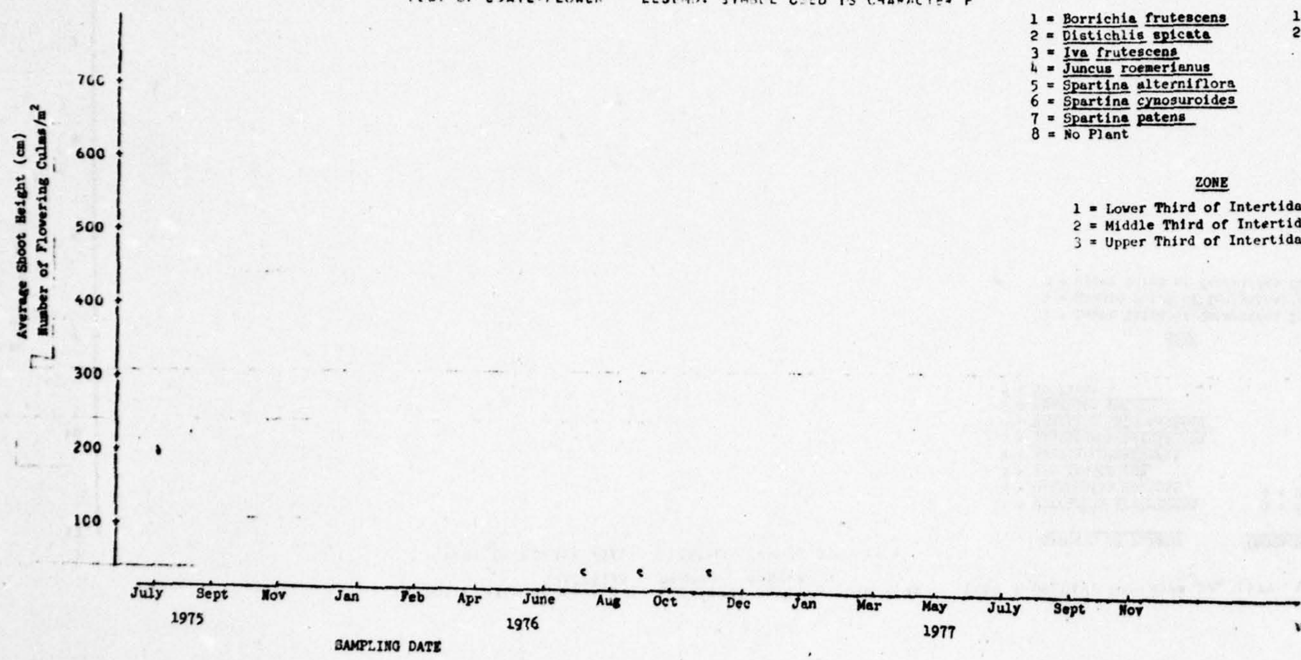
1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977   59
SPECIES=6   PROP=2   ZONE=2

PLOT OF CDATE*SH_HT   LEGEND: SYMBOL USED IS CHARACTER S
PLOT OF CDATE*FLOWER   LEGEND: SYMBOL USED IS CHARACTER F



SPECIES OF PLANTS

1 = Borrichia frutescens
2 = Distichlis spicata
3 = Iva frutescens
4 = Juncus roemerianus
5 = Spartina alterniflora
6 = Spartina cynosuroides
7 = Spartina patens
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

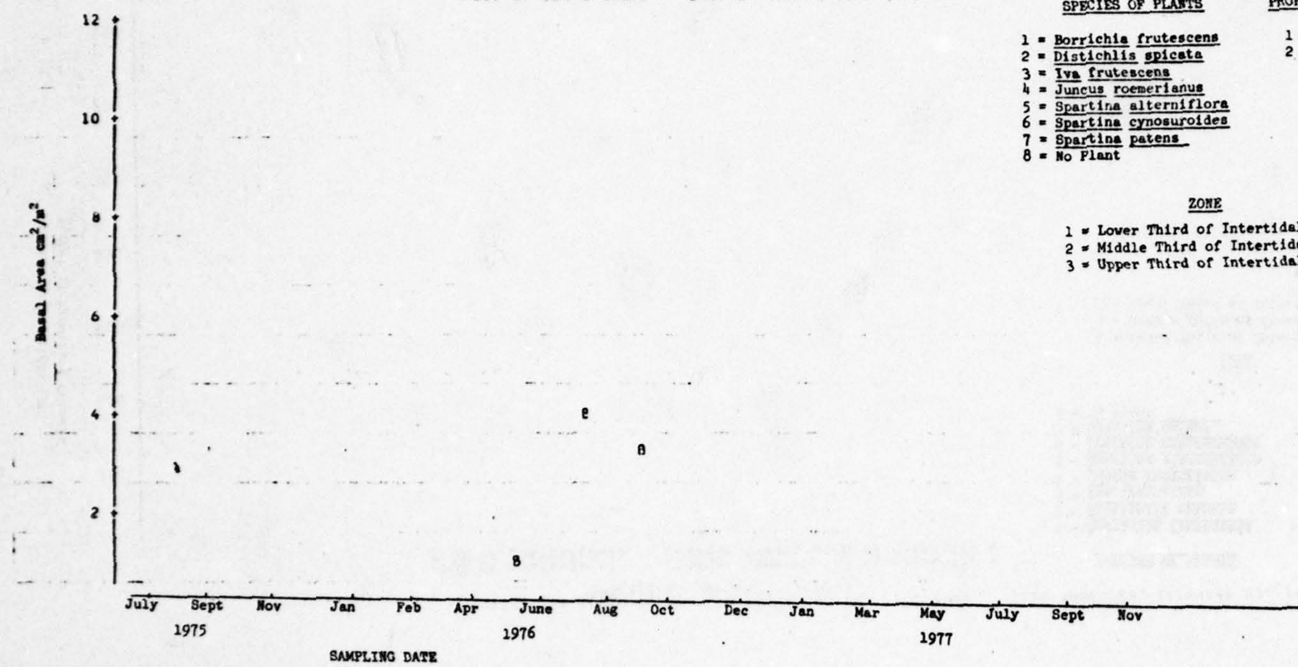
ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

D119

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977 146
SPECIES=6   PROP=2   ZONE=2

PLOT OF CDATE*BASAL   LEGEND: SYMBOL USED IS B



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

ZONE

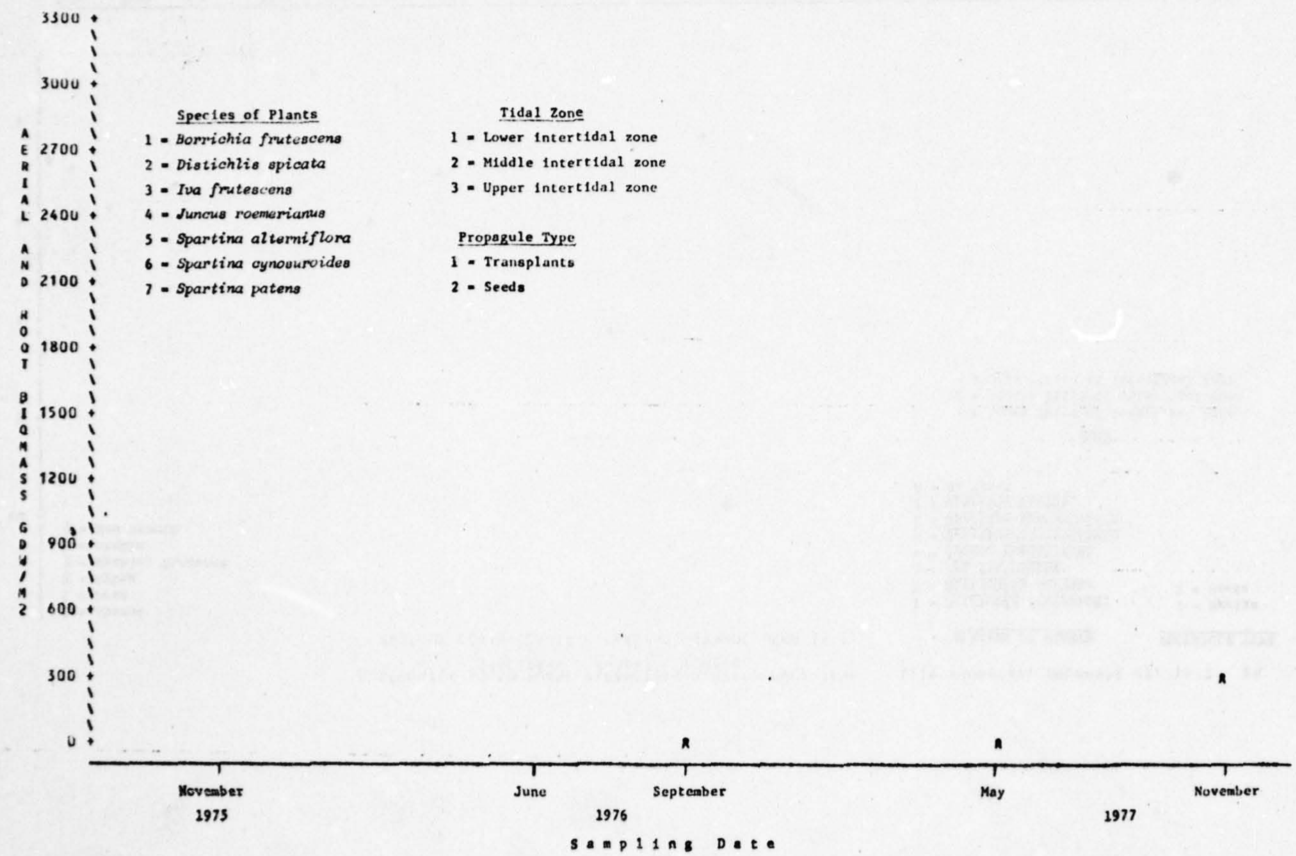
1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

D120

BUTTERMILK SOUND ROOT AND AERIAL BIOMASS BY SAMPLING DATE

SPECIES=6 PROP=2 ZONE=2

PLOT OF MOM*CDATE SYMBOL USED IS R
PLOT OF AER*CDATE SYMBOL USED IS A

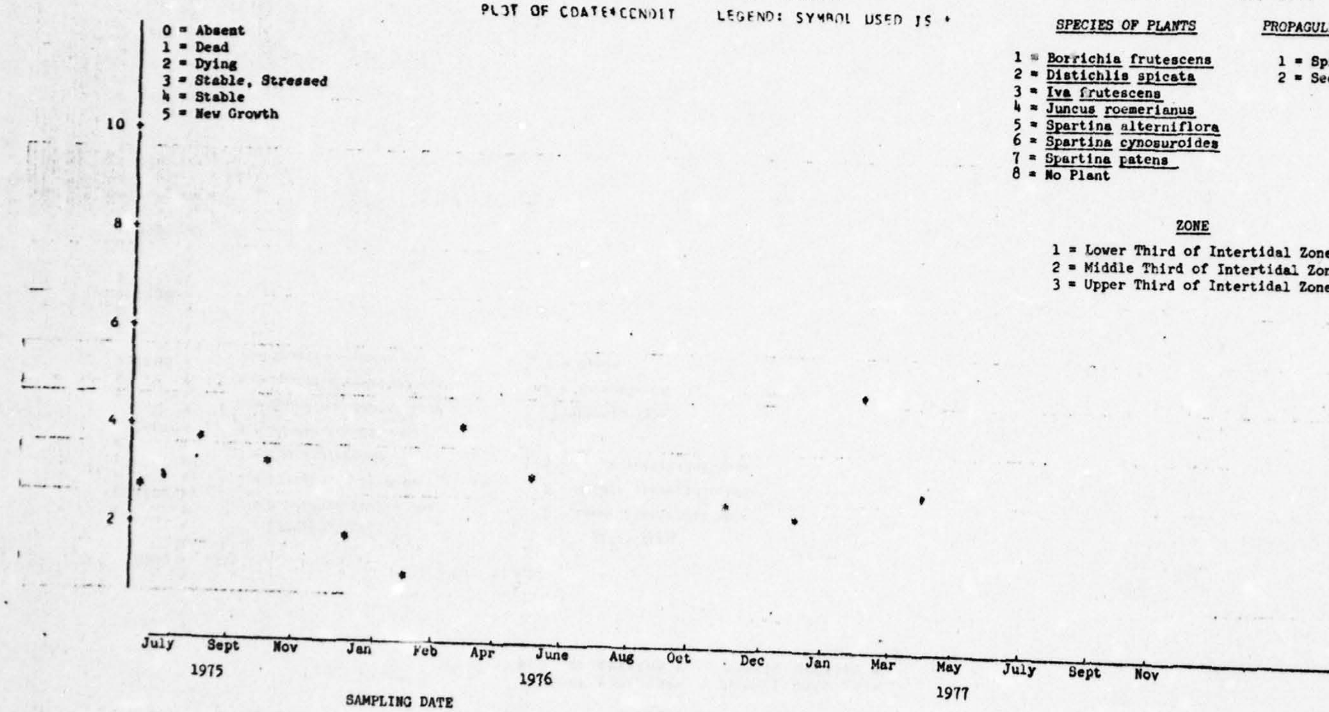


D121

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977   29

SPECIES=6   PROP=1   ZONE=3

PLOT OF CDATE*CCNDIT   LEGEND: SYMBOL USED IS *



SPECIES OF PLANTS

1 = <u>Borrichia frutescens</u>
2 = <u>Distichlis spicata</u>
3 = <u>Iva frutescens</u>
4 = <u>Juncus roemerianus</u>
5 = <u>Spartina alterniflora</u>
6 = <u>Spartina cynosuroides</u>
7 = <u>Spartina patens</u>
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

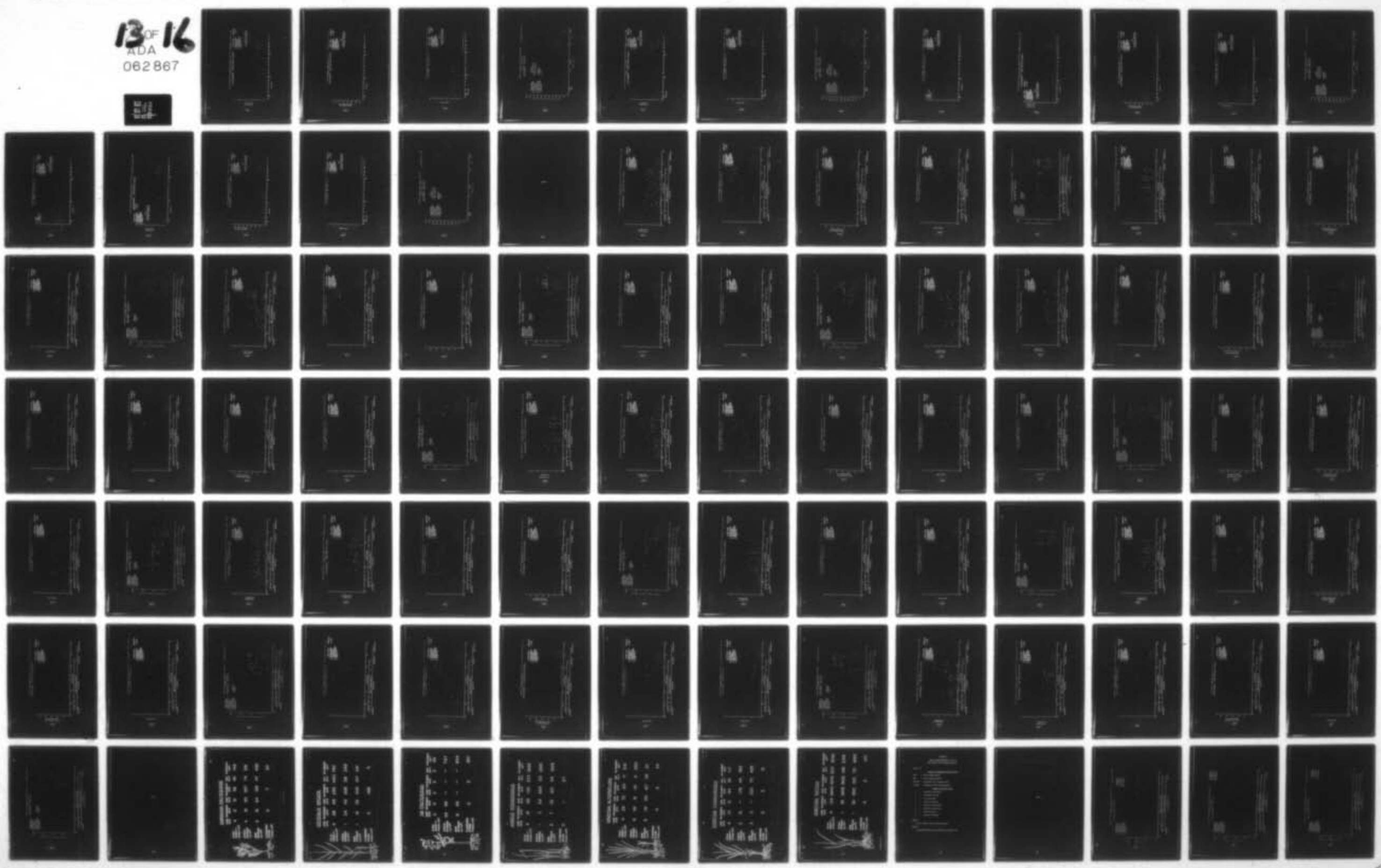
ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

D122

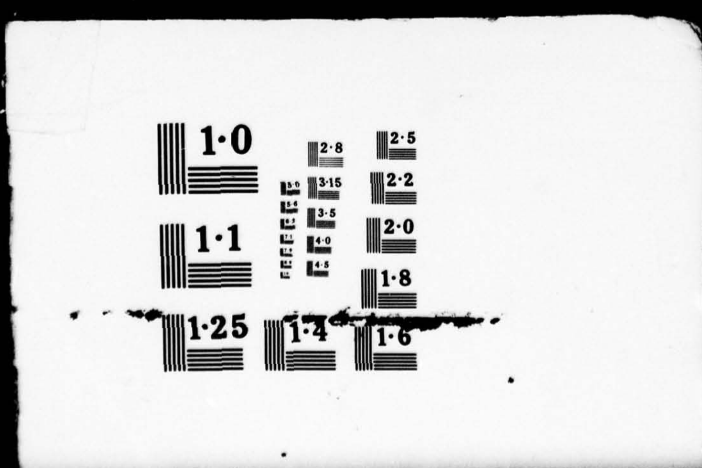
AD-A062 867 GEORGIA UNIV BRUNSWICK MARINE EXTENSION SERVICE F/G 13/2
HABITAT DEVELOPMENT FIELD INVESTIGATIONS BUTTERMILK SOUND MARSH --ETC(U)
JUL 78 R J REIMOLD, M A HARDISKY, P C ADAMS DACW21-75-C-007
UNCLASSIFIED WES-TR-D-78-26-APP-A NL

13 OF 16
ADA
062867



13 OF 16

ADA 062867

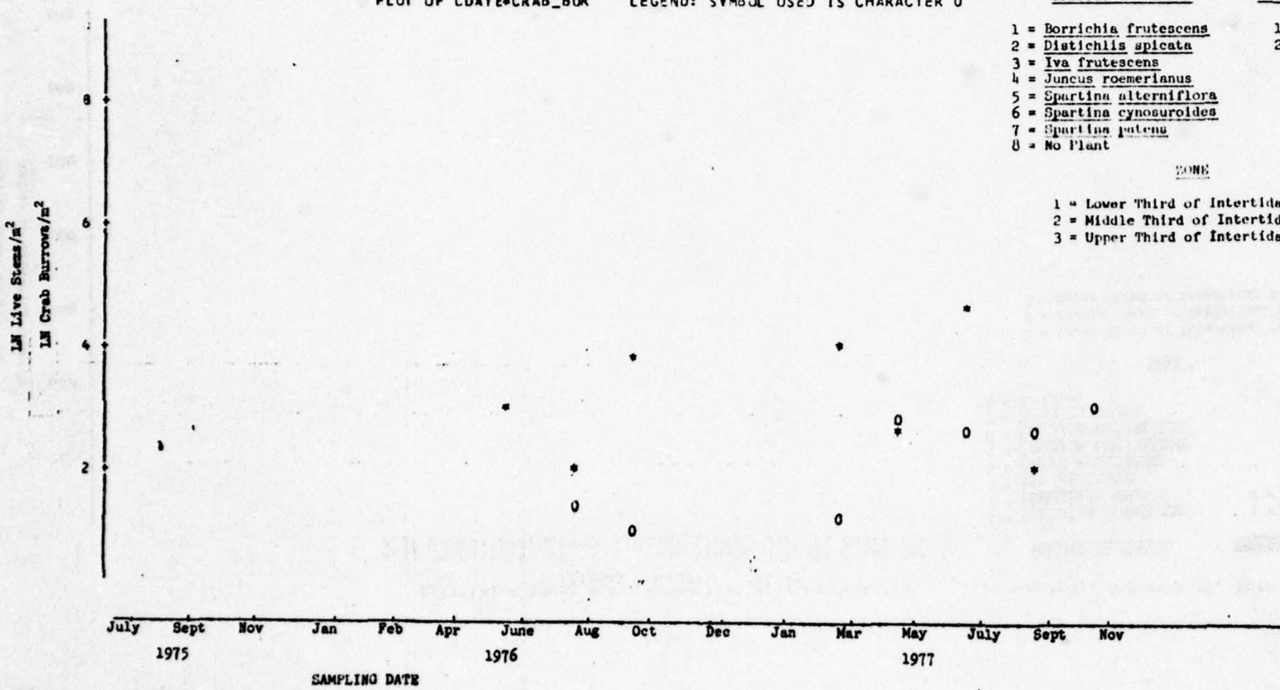


NATURAL LOGARITHMIC PLOT IF CULM DENSITY AND CRAB BURROWS DENSITY WITH TIME

23:36 WEDNESDAY, DECEMBER 21, 1977

SPECIES=6 PROP=2 ZONE=3

PLOT OF CDATE*STEM_D LEGEND: SYMBOL USED IS CHARACTER *
PLOT OF CDATE*CRAB_BUR LEGEND: SYMBOL USED IS CHARACTER 0



SPECIES OF PLANTS

1 = Borrichia frutescens
2 = Distichlis spicata
3 = Iva frutescens
4 = Juncus roemerianus
5 = Spartina alterniflora
6 = Spartina cynosuroides
7 = Spartina patens
8 = No Plant

PROPAGULE TYPE

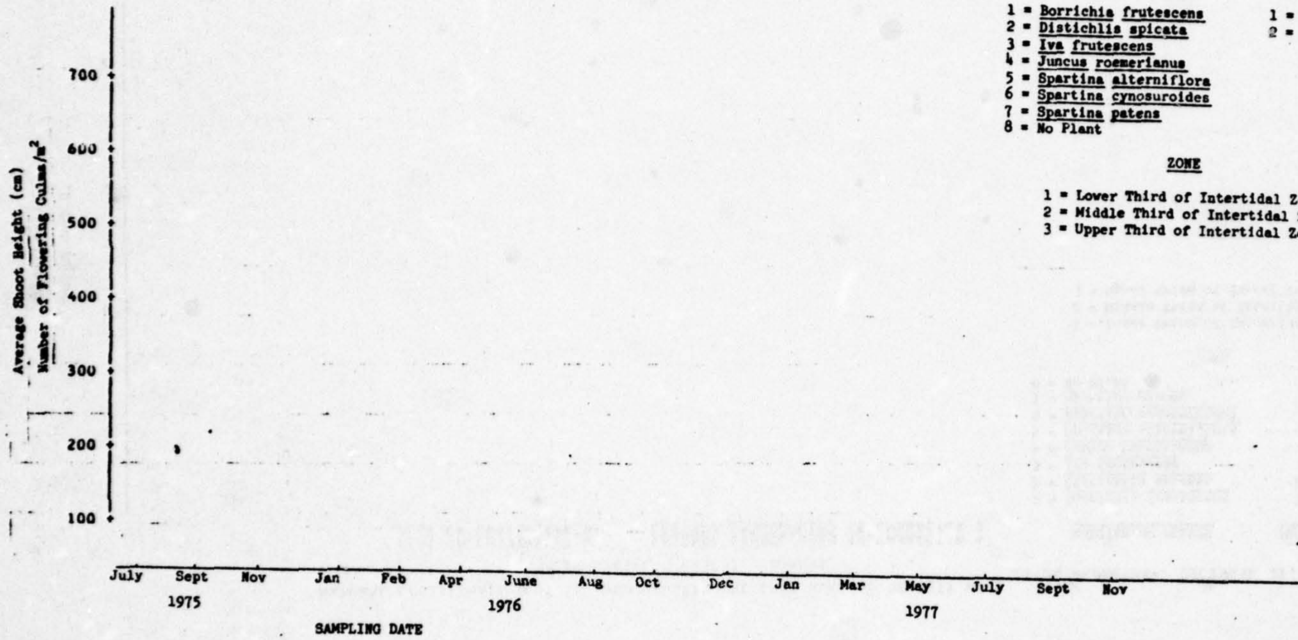
1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 1:19 THURSDAY, DECEMBER 22, 1977 58
SPECIES=6 PROP=1 ZONE=3

PLOT OF CDATE*SH_HT LEGEND: SYMBOL USED IS CHARACTER S
PLOT OF CDATE*FLOWER LEGEND: SYMBOL USED IS CHARACTER F



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

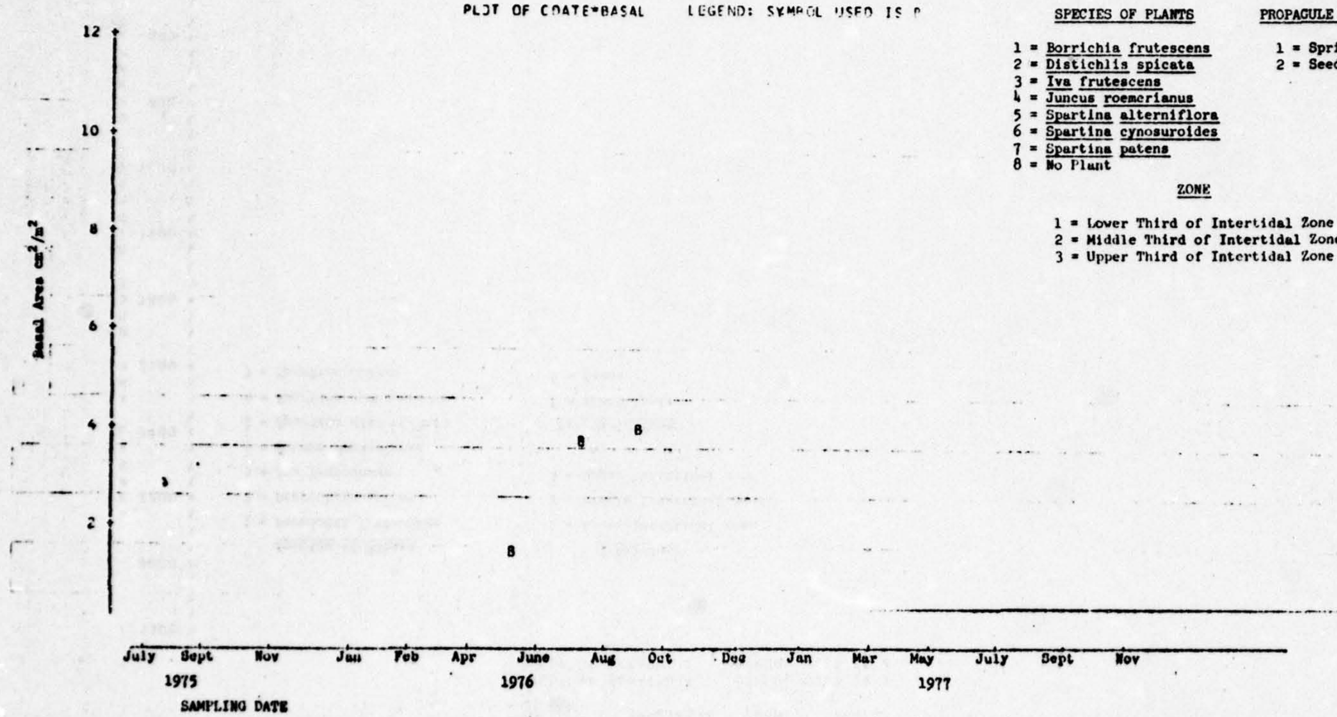
ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

D124

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 1:19 THURSDAY, DECEMBER 22, 1977 147
SPECIES=6 PROP=2 ZONE=3

PLOT OF CDATE*BASAL LEGEND: SYMBOL USED IS 8



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

ZONE

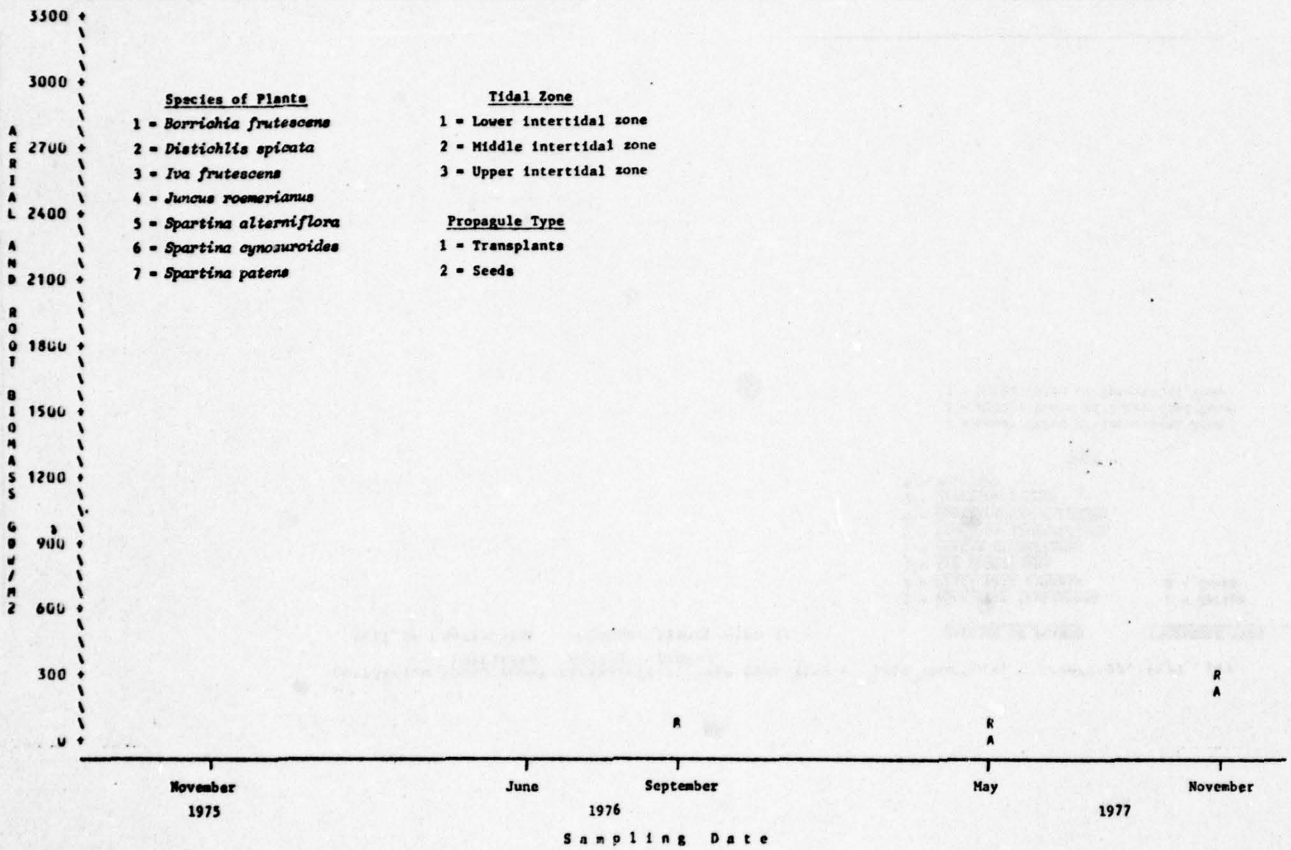
1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

BUTTERMILK SOUND ROOT AND AERIAL BIOMASS BY SAMPLING DATE 26

17:35 THURSDAY, APRIL 13, 1978

SPECIES=6 PROP=2 ZONE=3

PLOT OF ROM*CDATE SYMBOL USED IS R
PLOT OF AER*CDATE SYMBOL USED IS A

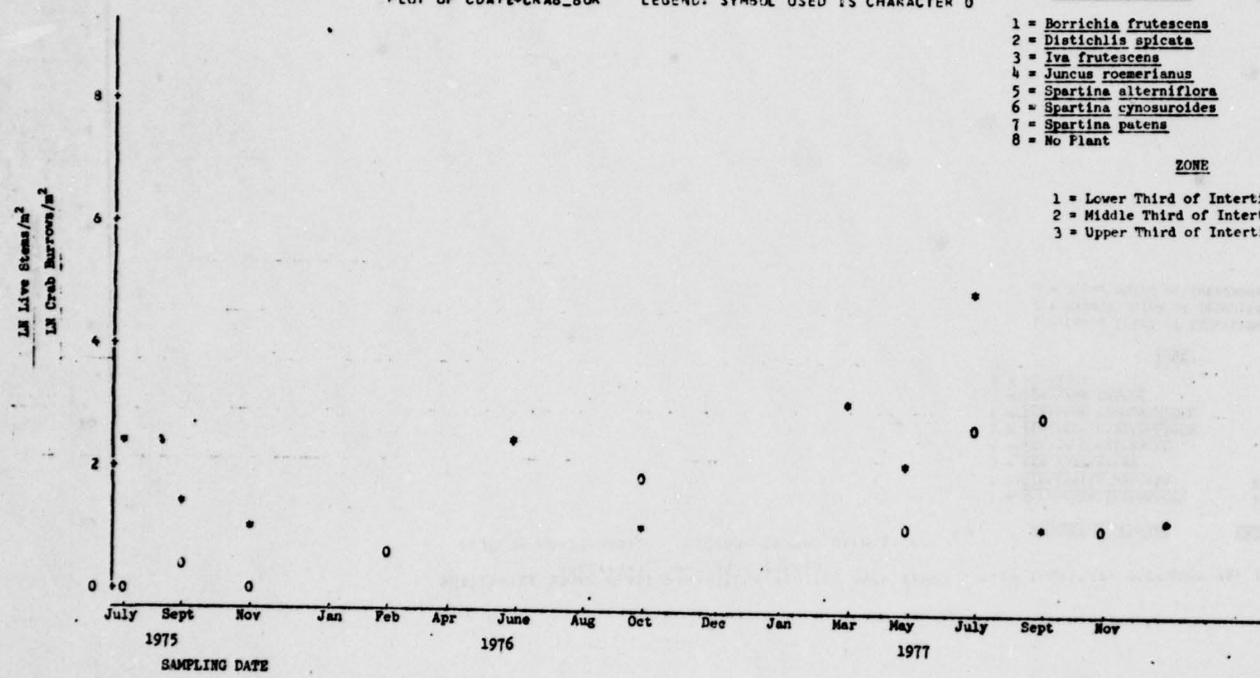


D126

NATURAL LOGARITHMIC PLOT IF CULM DENSITY AND CRAB BURROWS DENSITY WITH TIME 23:36 WEDNESDAY, DECEMBER 21, 1977 32

SPECIES=7 PROP=1 ZONE=2

PLOT OF CDATE*STEM_D LEGEND: SYMBOL USED IS CHARACTER *
PLOT OF CDATE*CRAB_BUR LEGEND: SYMBOL USED IS CHARACTER 0



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

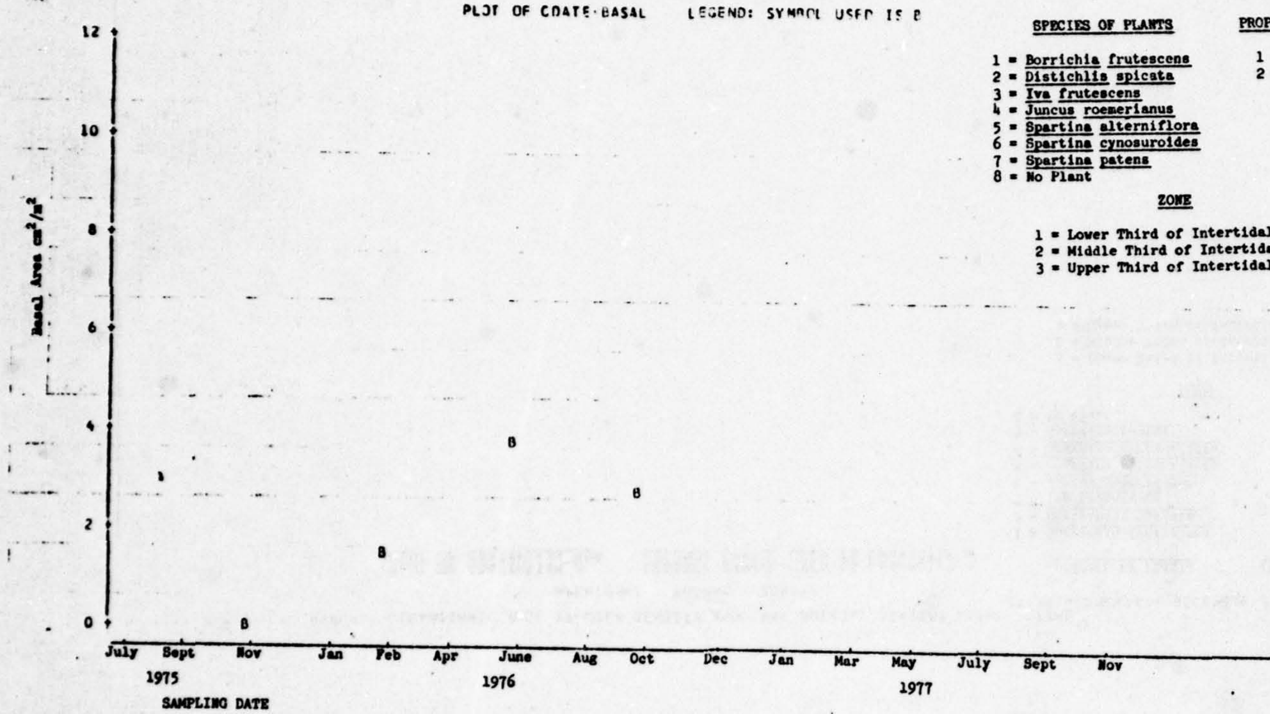
1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977 148
SPECIES=7 PROP=1 ZONE=2

PLOT OF CDATE·BASAL   LEGEND: SYMBOL USED IS B



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

ZONE

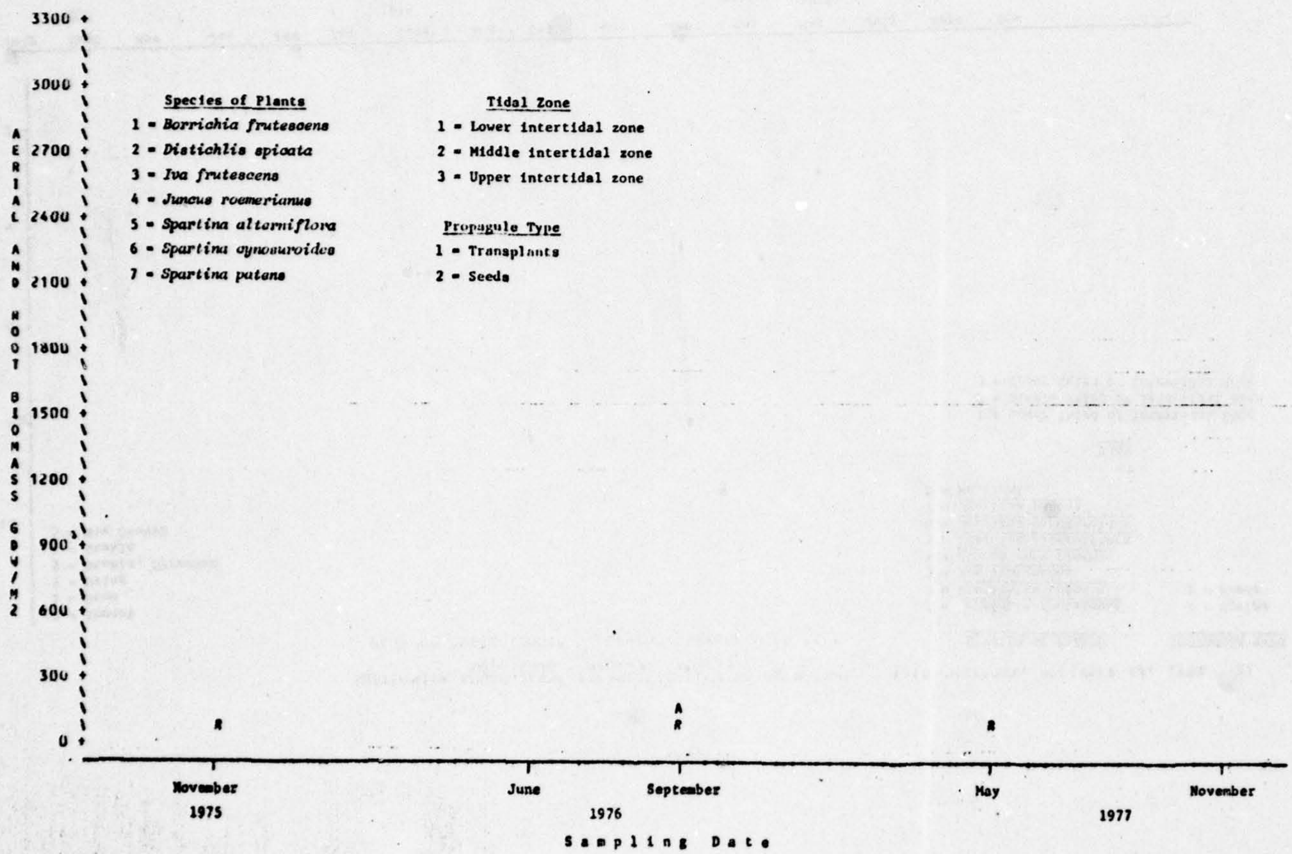
1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

D12C

BUTTERMILK SOUND ROOT AND AERIAL BIOMASS BY SAMPLING DATE   17:35 THURSDAY, APRIL 13, 1978   27

SPECIES=7   PROP=1   ZONE=2

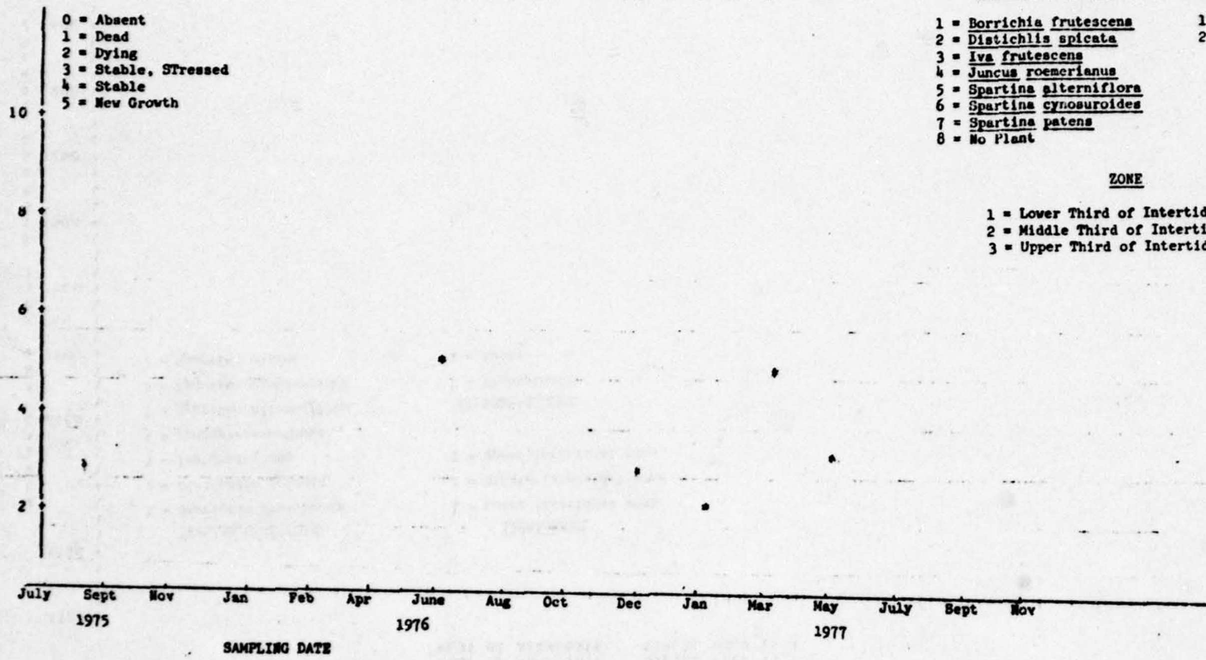
PLOT OF ROM*CDATE   SYMBOL USED IS R
PLOT OF AER*CDATE   SYMBOL USED IS A



D129

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977   31
SPECIES=6   PROP=2   ZONE=3

PLOT OF CDATE*CONDIT   LEGEND: SYMBOL USED IS *



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

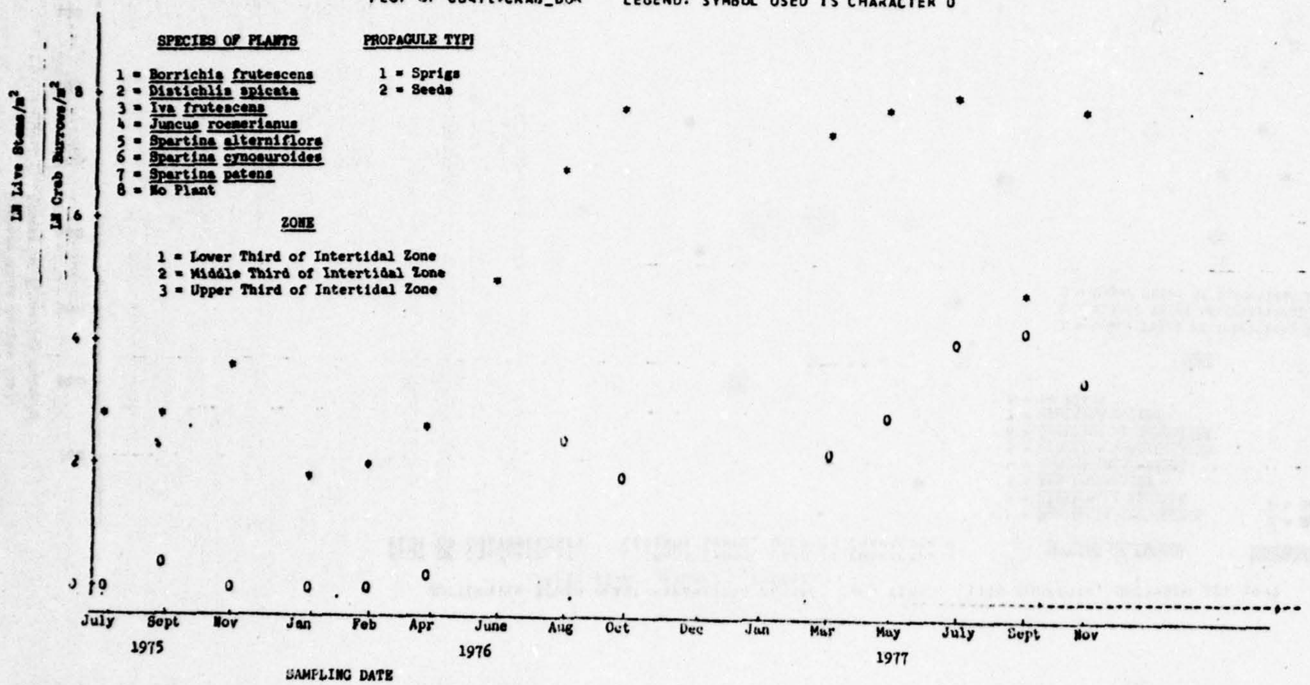
1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

NATURAL LOGARITHMIC PLOT IF CULM DENSITY AND CRAB BURROWS DENSITY WITH TIME
23:36 WEDNESDAY, DECEMBER 21, 1977 33
SPECIES=7 PROP=1 ZONE=3

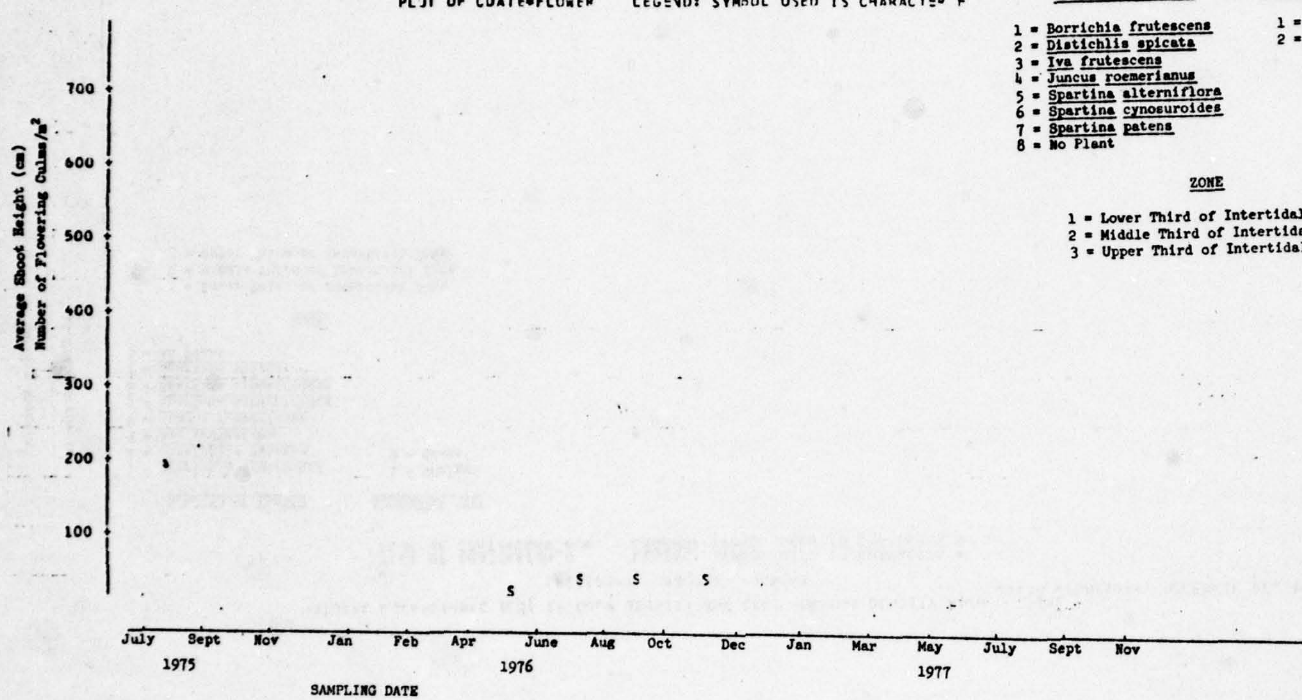
PLOT OF CDATE*STEM_D LEGEND: SYMBOL USED IS CHARACTER *
PLOT OF CDATE*CRAB_BUR LEGEND: SYMBOL USED IS CHARACTER 0



D131

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977   60
SPECIES=6   PROP=2   ZONE=3

PLOT OF CDATE*SH_HT   LEGEND: SYMBOL USED IS CHARACTER S
PLOT OF CDATE*FLOWER   LEGEND: SYMBOL USED IS CHARACTER F



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

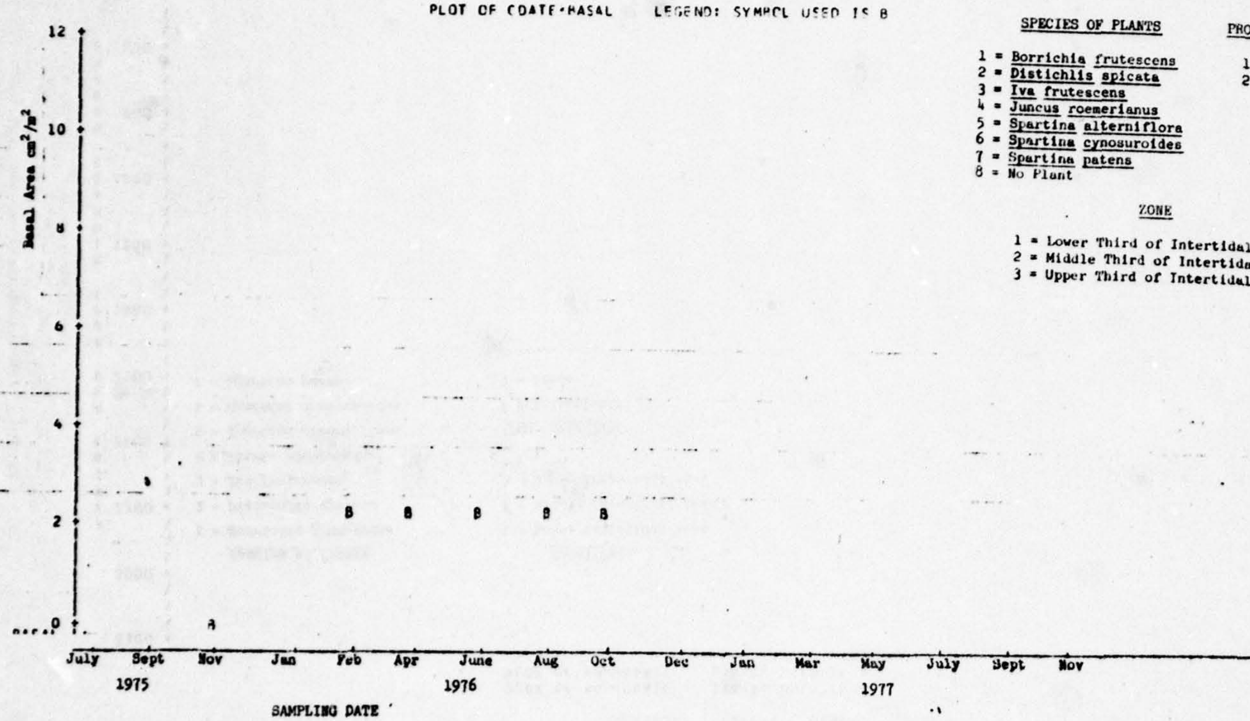
1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977 149
SPECIES=7   PROP=1   ZONE=3

PLOT OF CDATE*BASAL   LEGEND: SYMBOL USED IS B



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

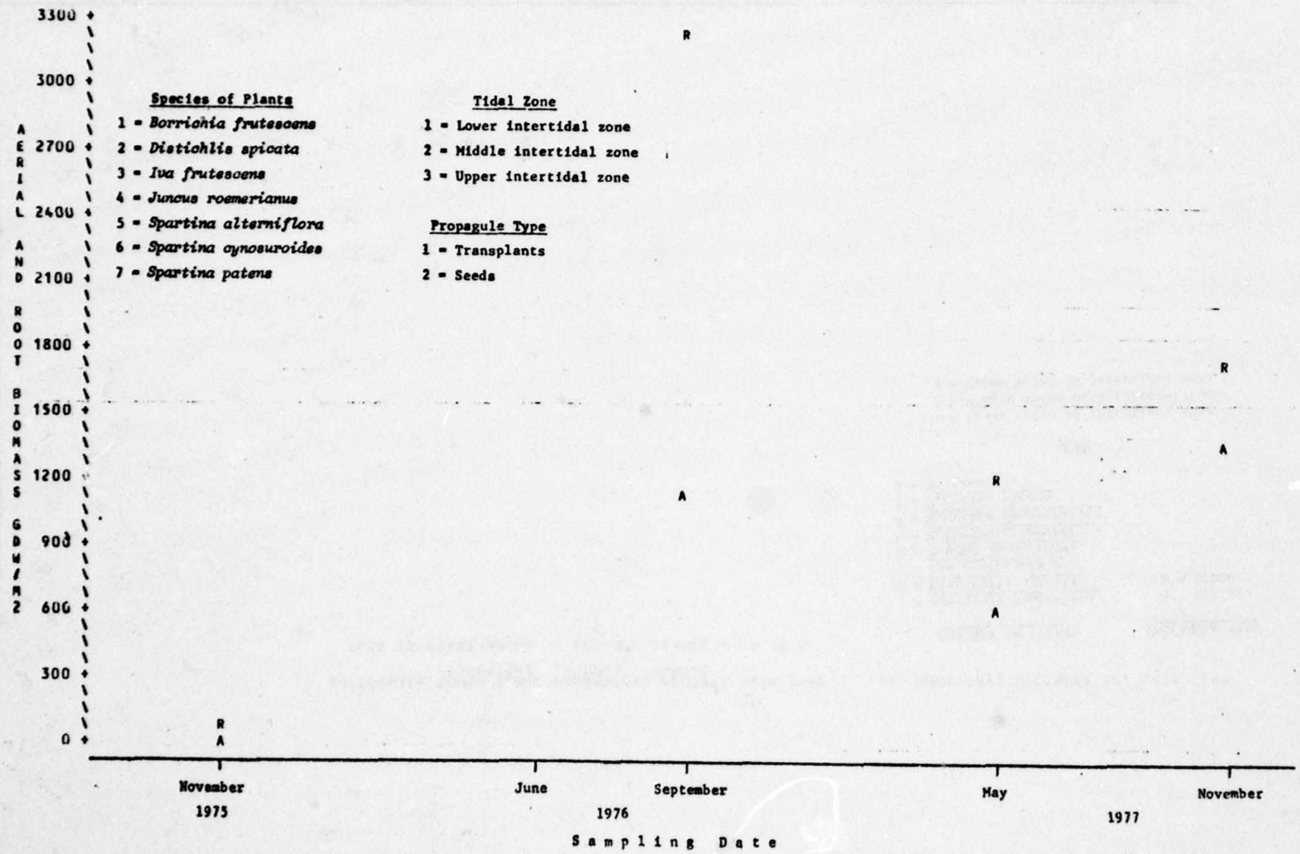
D133

BUTTERMILK SOUND ROOT AND AERIAL BIOMASS BY SAMPLING DATE

17:55 THURSDAY, APRIL 13, 1978

SPECIES=7 PROP=1 ZONE=3

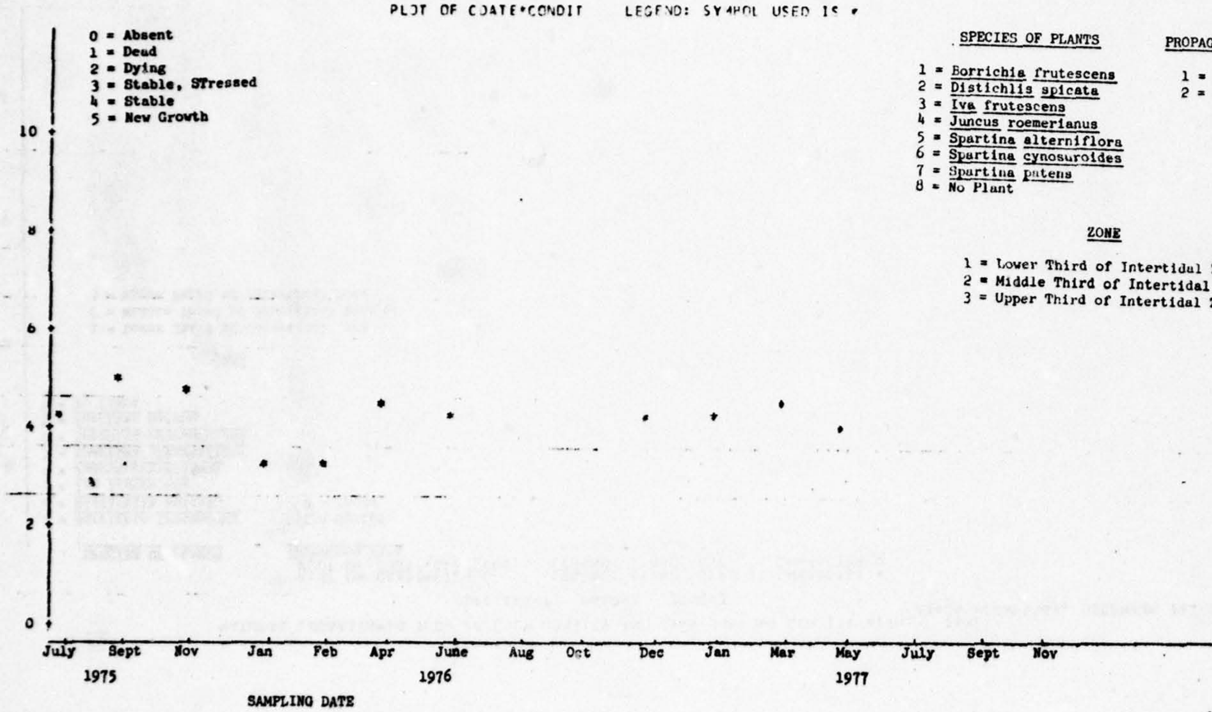
PLOT OF ROM*CDATE SYMBOL USED IS R
PLOT OF AER*CDATE SYMBOL USED IS A



D134

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977   33
SPECIES=7   PROP=1   ZONE=3

PLOT OF CDATE*CONDIT   LEGEND: SYMBOL USED IS *



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

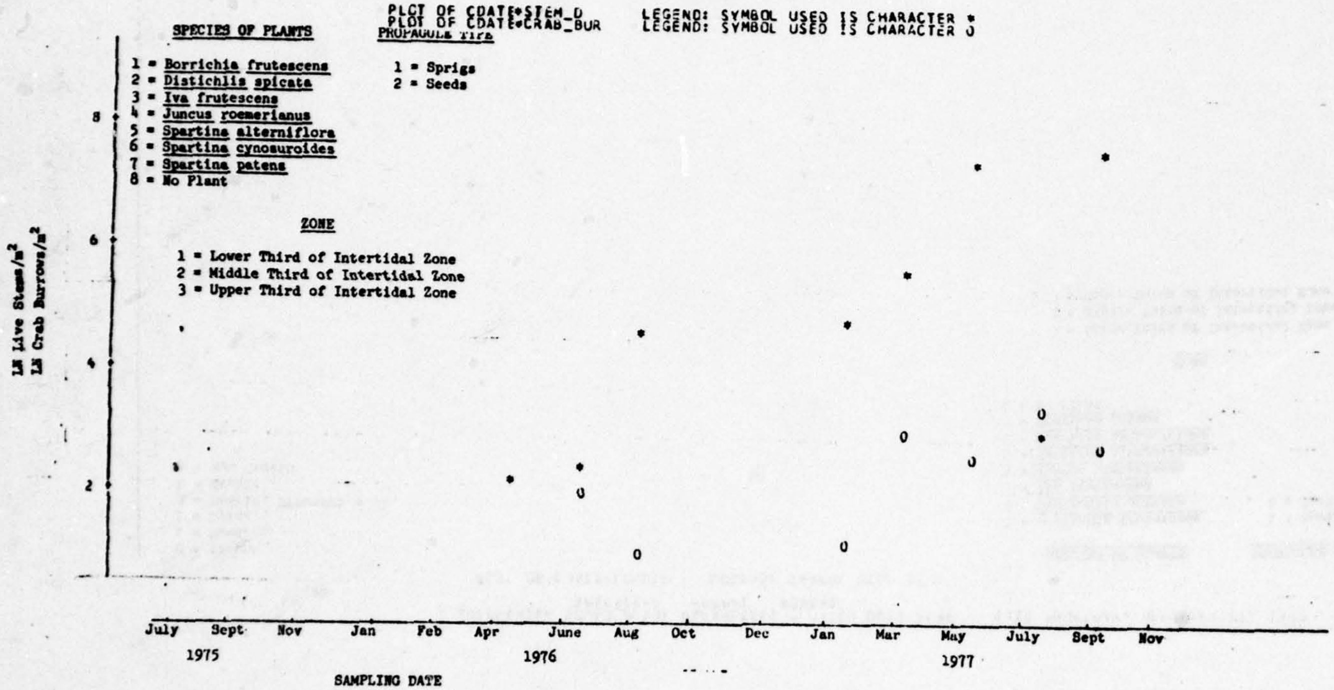
ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

NATURAL LOGARITHMIC PLOT IF CULM DENSITY AND CRAB BURROWS DENSITY WITH TIME 35

SPECIES=7 PROP=2 ZONE=3 23:36 WEDNESDAY, DECEMBER 21, 1977

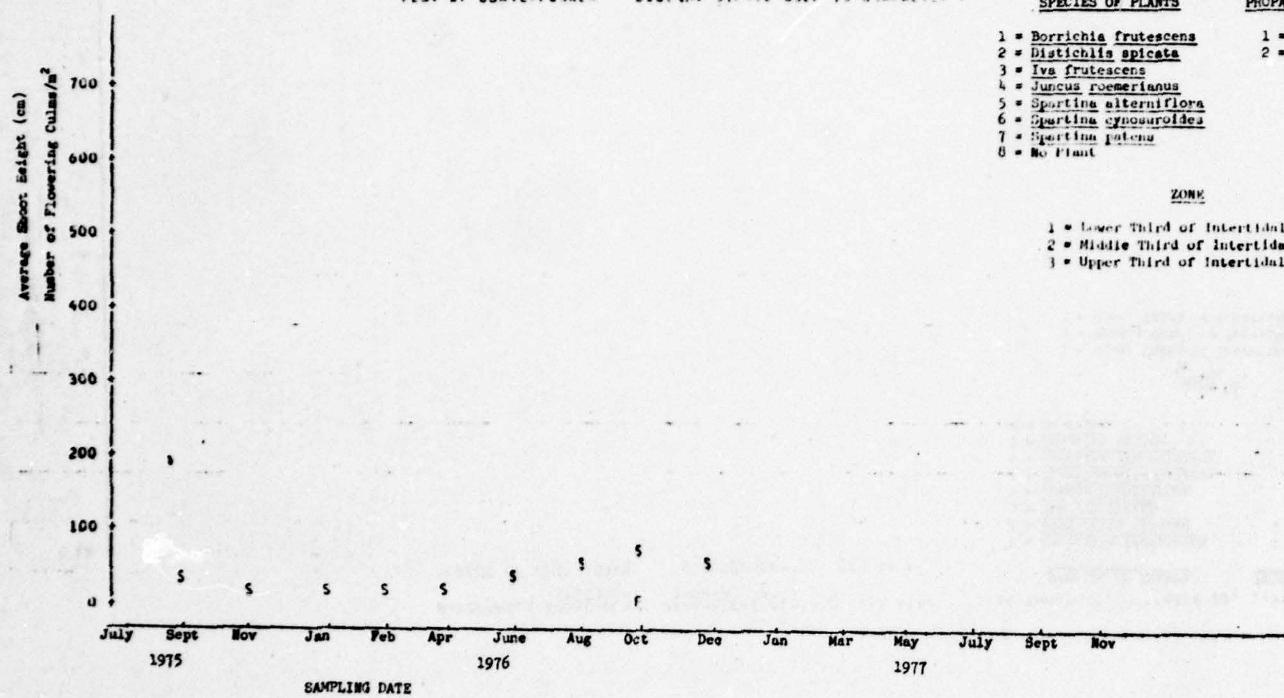
PLOT OF CDATE*STEM_D LEGEND: SYMBOL USED IS CHARACTER *
PLOT OF CDATE*CRAB_BUR LEGEND: SYMBOL USED IS CHARACTER O



D136

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 1:19 THURSDAY, DECEMBER 22, 1977 62
SPECIES=7 PROP=1 ZONE=3

PLOT OF CDATE*SH_HT LEGEND: SYMBOL USED IS CHARACTER S
PLOT OF CDATE*FLOWER LEGEND: SYMBOL USED IS CHARACTER F



SPECIES OF PLANTS

1 = Borrichia frutescens
2 = Distichlis spicata
3 = Iva frutescens
4 = Juncus roemerianus
5 = Spartina alterniflora
6 = Spartina cynosuroides
7 = Spartina patens
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

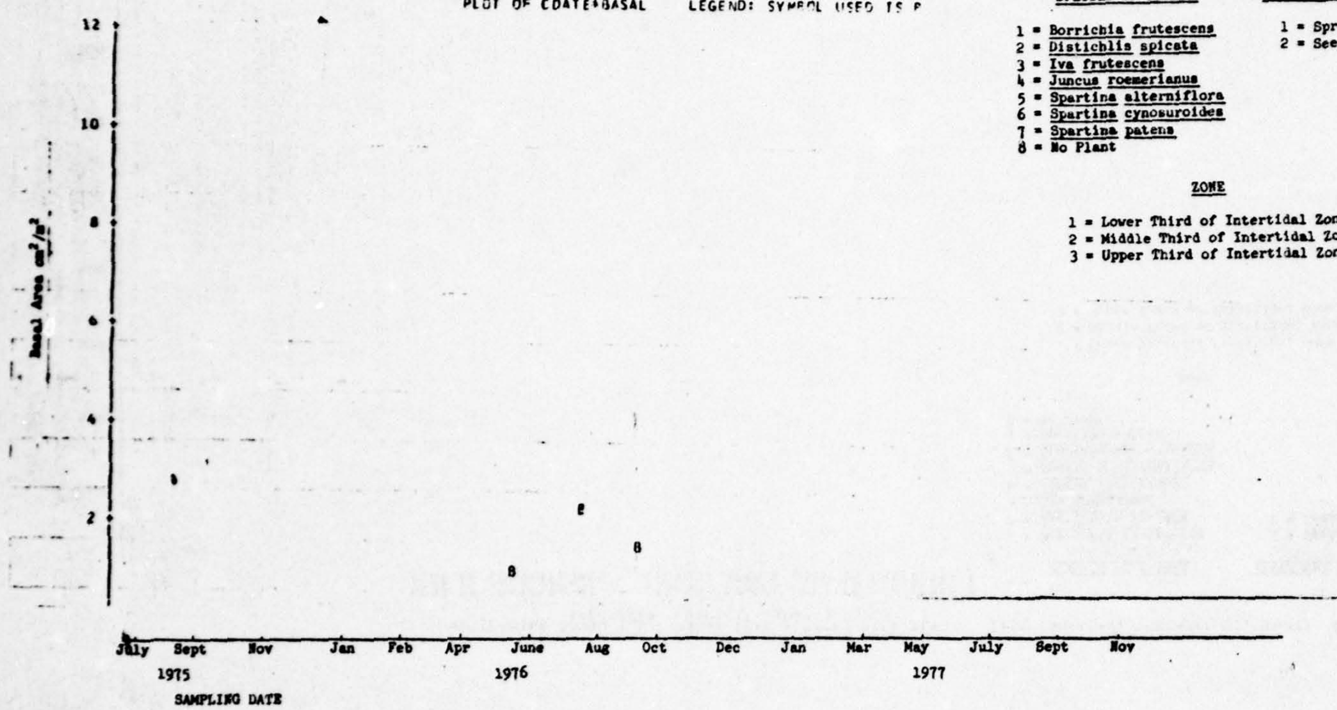
ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

D137

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   1:19 THURSDAY, DECEMBER 22, 1977 151
SPECIES=7 PROP=2 ZONE=3

PLOT OF CDATE*BASAL   LEGEND: SYMBOL USED IS P



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

ZONE

1 = Lower Third of Intertidal Zone
2 = Middle Third of Intertidal Zone
3 = Upper Third of Intertidal Zone

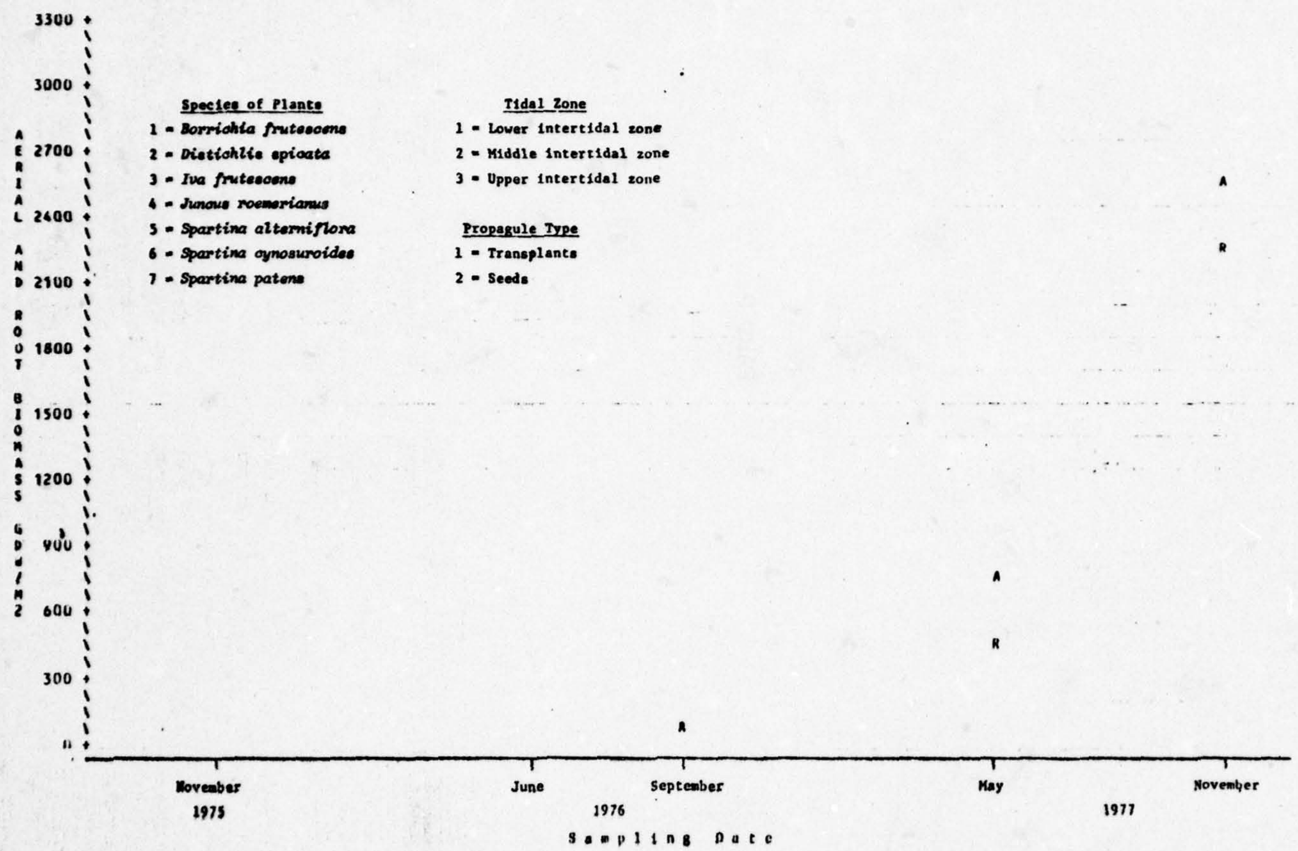
D138

BUTTERMILK SOUND ROOT AND AERIAL BIOMASS BY SAMPLING DATE

17:35 THURSDAY, APRIL 13, 1978

SPECIES=7 PROP=2 ZONE=3

PLOT OF RGM*CDATE SYMBOL USED IS R
PLOT OF AER*CDATE SYMBOL USED IS A

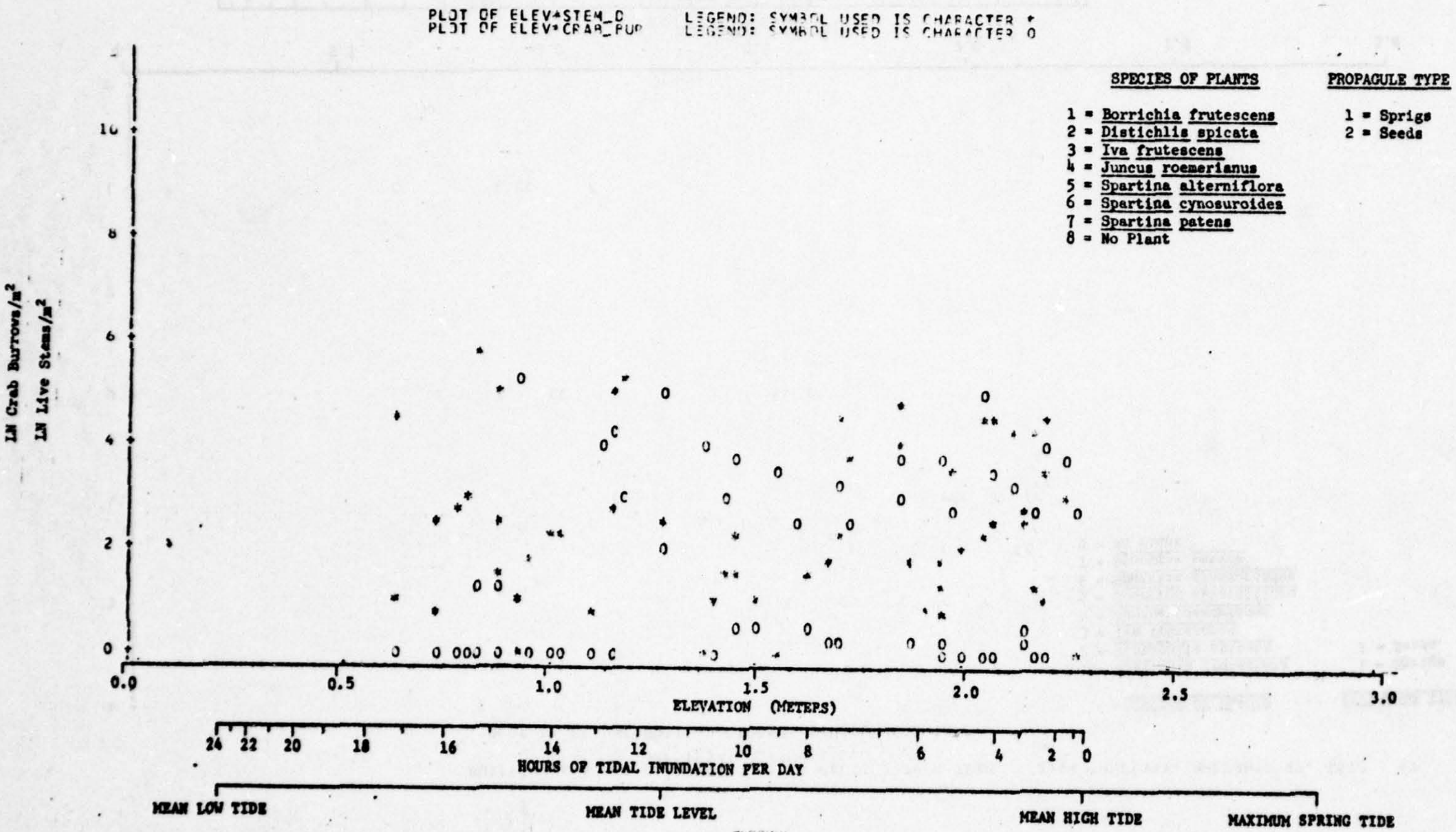


D139

PART 2

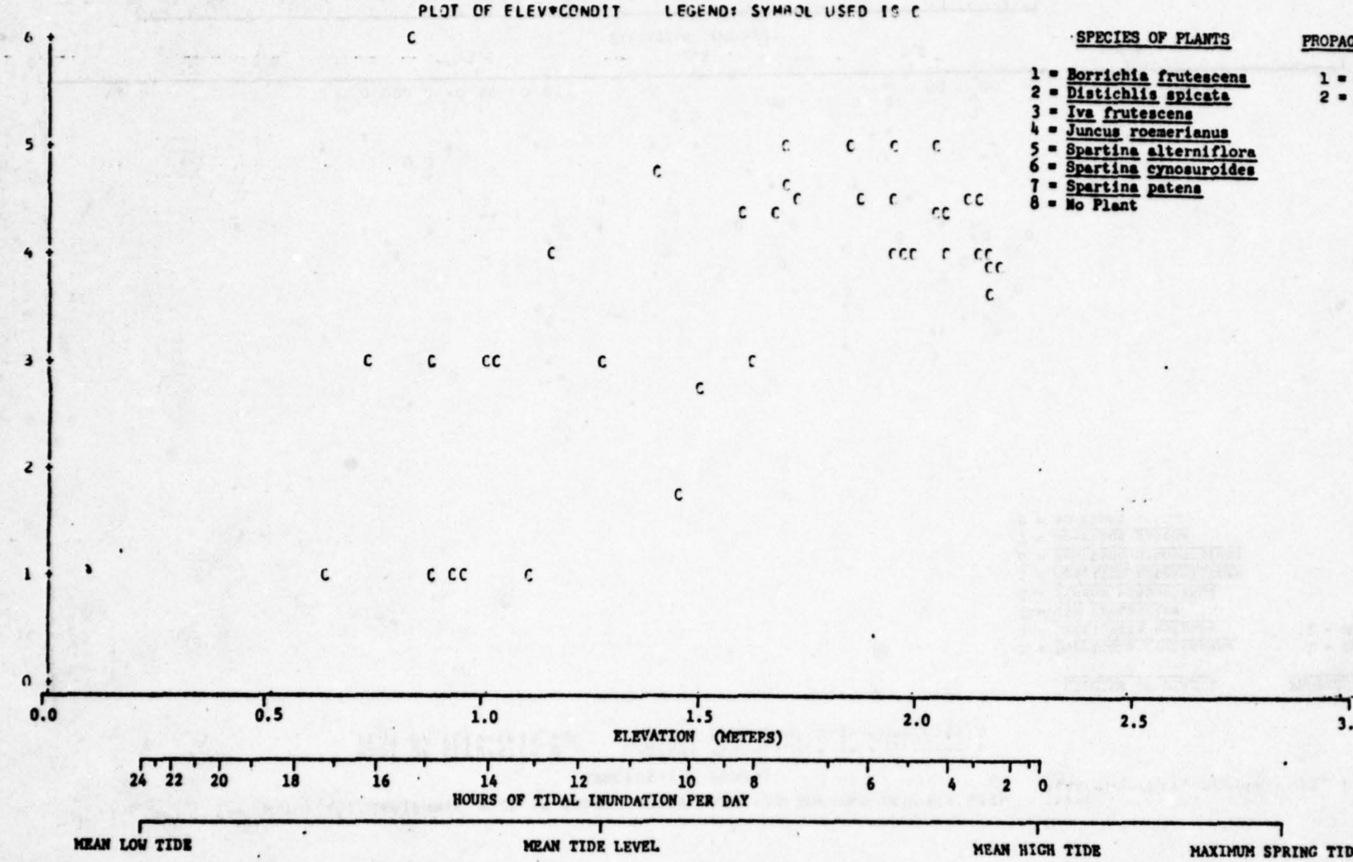
NATURAL LOGARITHMIC PLOT IF CULM DENSITY AND CRAB BURROWS DENSITY WITH TIME 2:44 THURSDAY, DECEMBER 22, 1977 31

SPECIES=1 PROP=1



BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 2:44 THURSDAY, DECEMBER 22, 1977 47
SPECIES=1 PROP=1

PLOT OF ELEV*CONDIT LEGEND: SYMBOL USED IS C



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

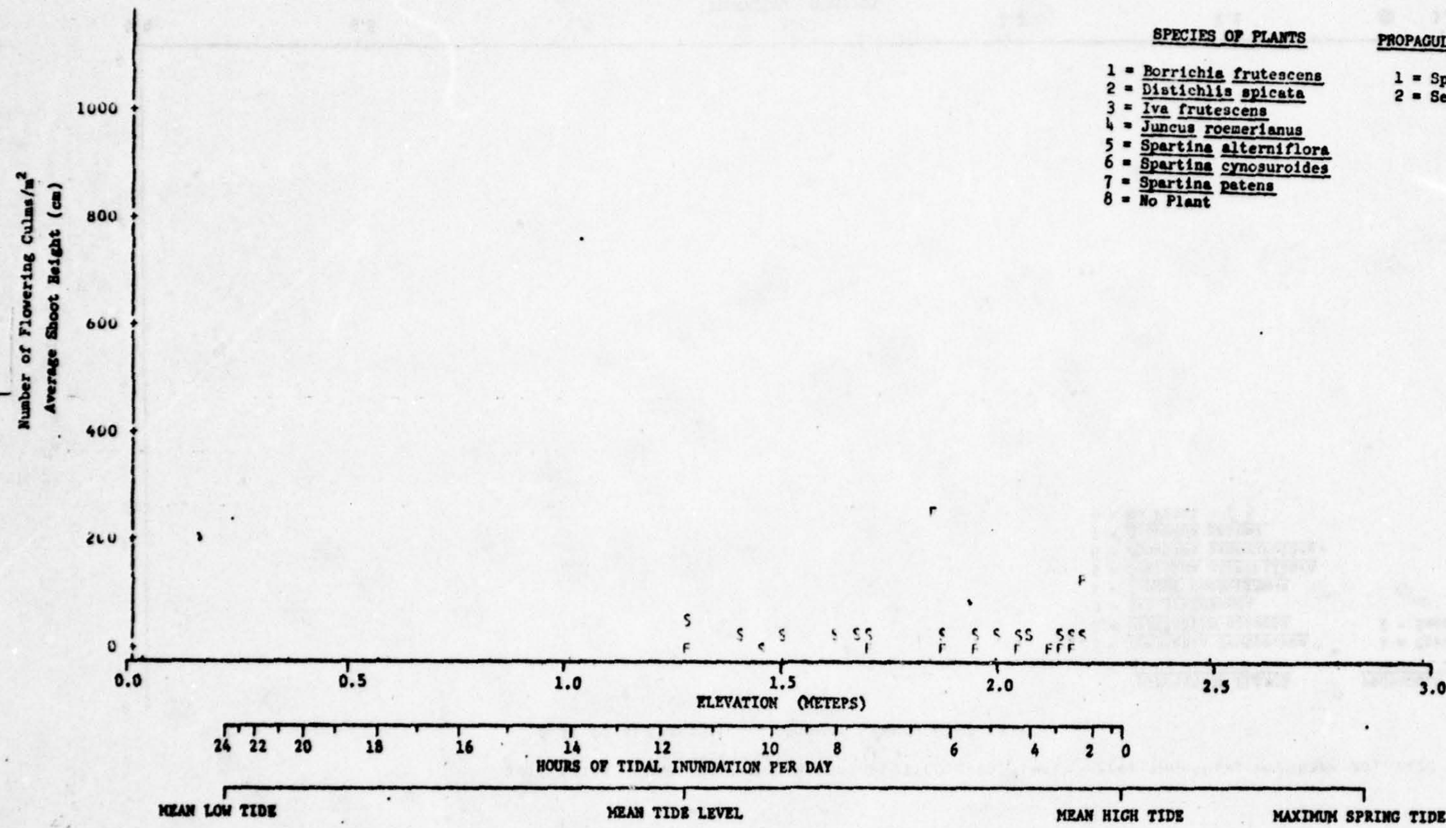
PROPAGULE TYPE

1 = Sprigs
2 = Seeds

D142

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 2:44 THURSDAY, DECEMBER 22, 1977 63
SPECIES=1 PROP=1

PLOT OF ELEV*SH_HT LEGEND: SYMBOL USED IS CHARACTER S
PLOT OF ELEV*FLOWER LEGEND: SYMBOL USED IS CHARACTER F



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

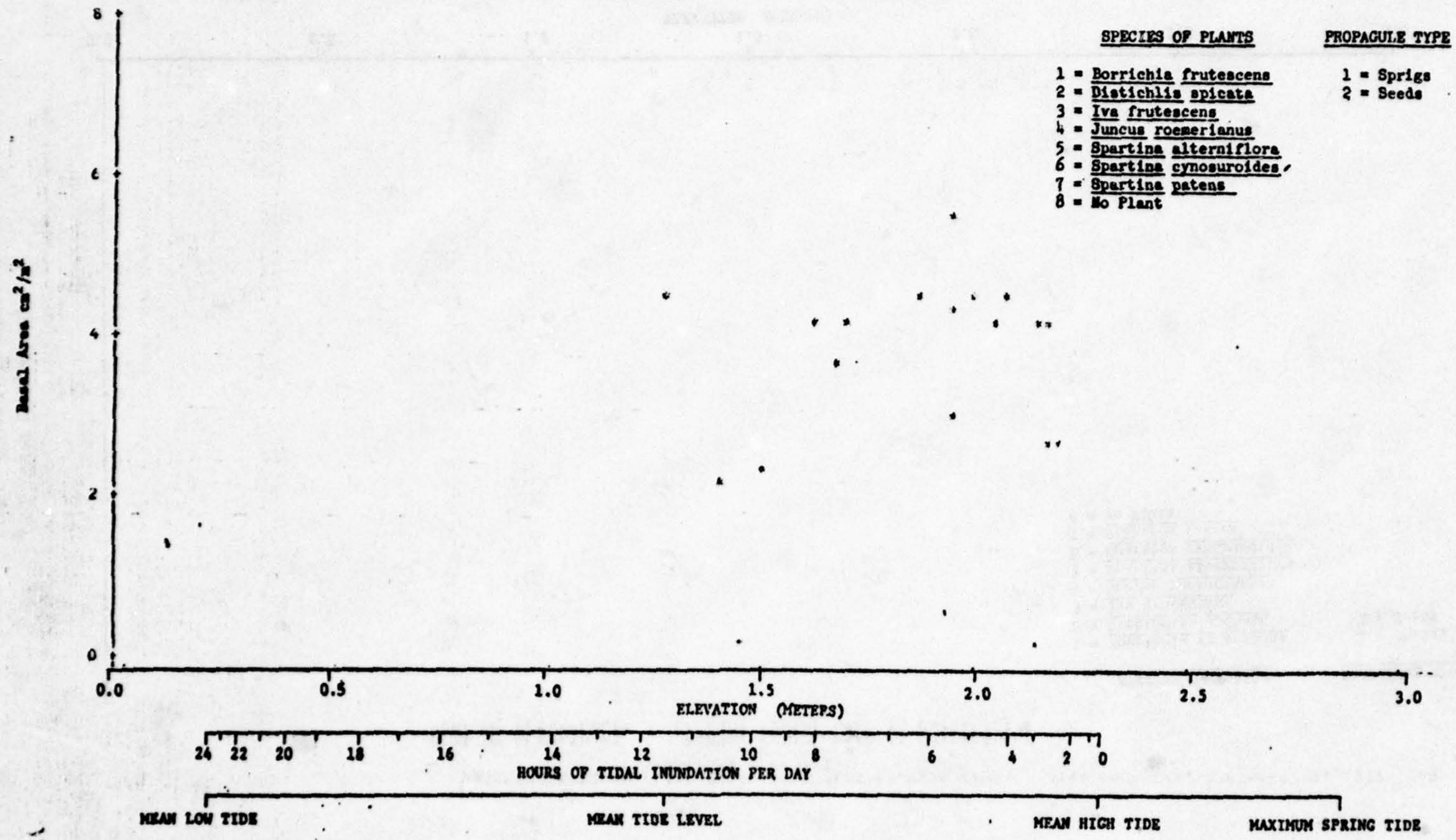
PROPAGULE TYPE

1 = Sprigs
2 = Seeds

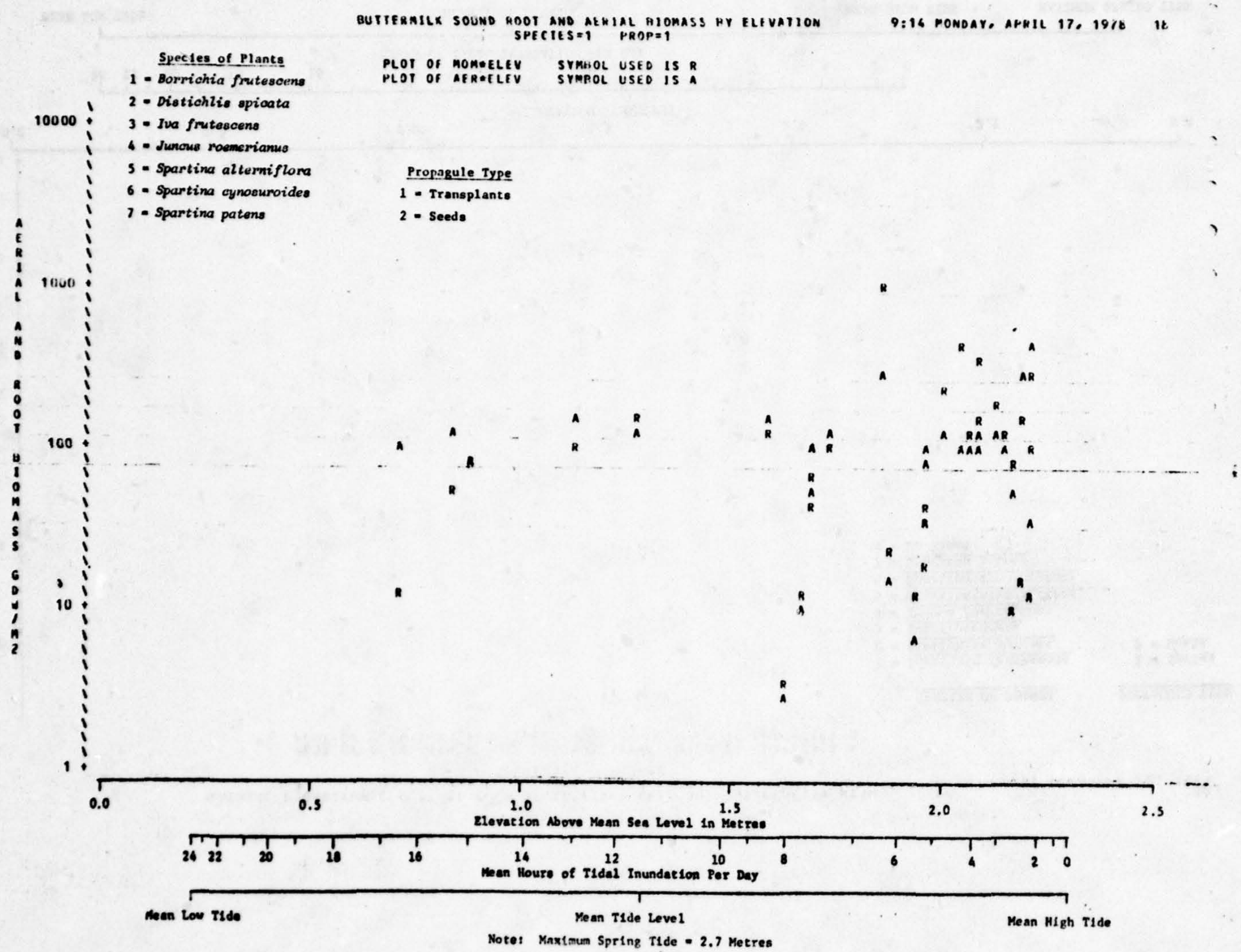
D143

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 2:44 THURSDAY, DECEMBER 22, 1977 111
SPECIES=1 PROP=1

PLOT OF ELEV*BASAL LEGEND: SYMBOL USED IS +



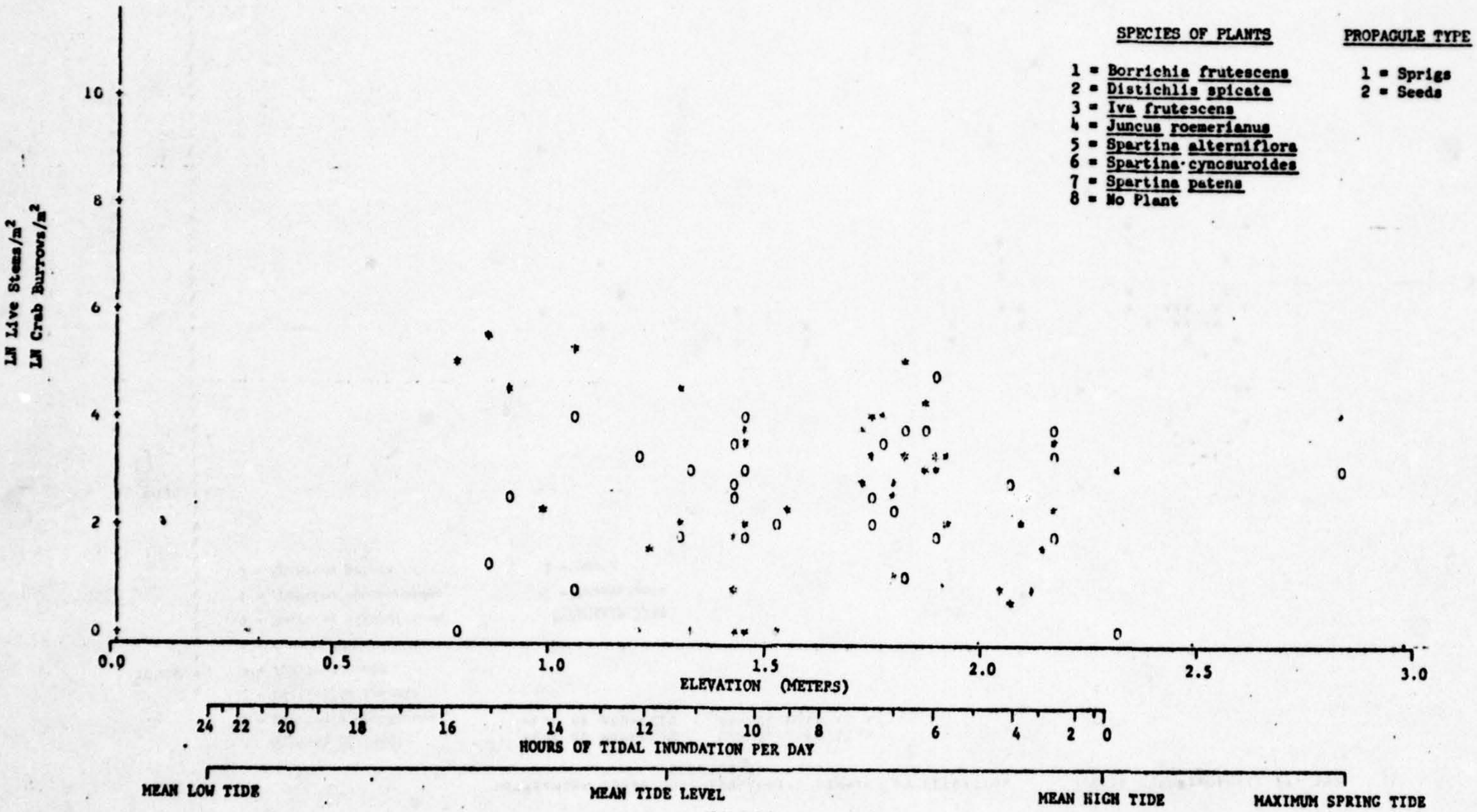
D144


BUTTERMILK SOUND ROOT AND AERIAL BIOMASS BY ELEVATION 9:14 MONDAY, APRIL 17, 1978 18
SPECIES=1 PROP=1
PLOT OF ROM*ELEV SYMBOL USED IS R
PLOT OF AER*ELEV SYMBOL USED IS A
Species of Plants
1 = Borrichia frutescens
2 = Distichlis spicata
3 = Iva frutescens
4 = Juncus roemerianus
5 = Spartina alterniflora
6 = Spartina cynosuroides
7 = Spartina patens
Propagule Type
1 = Transplants
2 = Seeds
AERIAL AND ROOT BIOMASS G DW/M2
10000
1000
100
10
1
0.0
0.5
1.0
1.5
2.0
2.5
Elevation Above Mean Sea Level in Metres
24 22 20 18 16 14 12 10 8 6 4 2 0
Mean Hours of Tidal Inundation Per Day
Mean Low Tide
Mean Tide Level
Mean High Tide
Note: Maximum Spring Tide = 2.7 Metres

NATURAL LOGARITHMIC PLOT IF CULM DENSITY AND CRAB BURROWS DENSITY WITH TIME 2:44 THURSDAY, DECEMBER 22, 1977 32

SPECIES=1 PROP=2

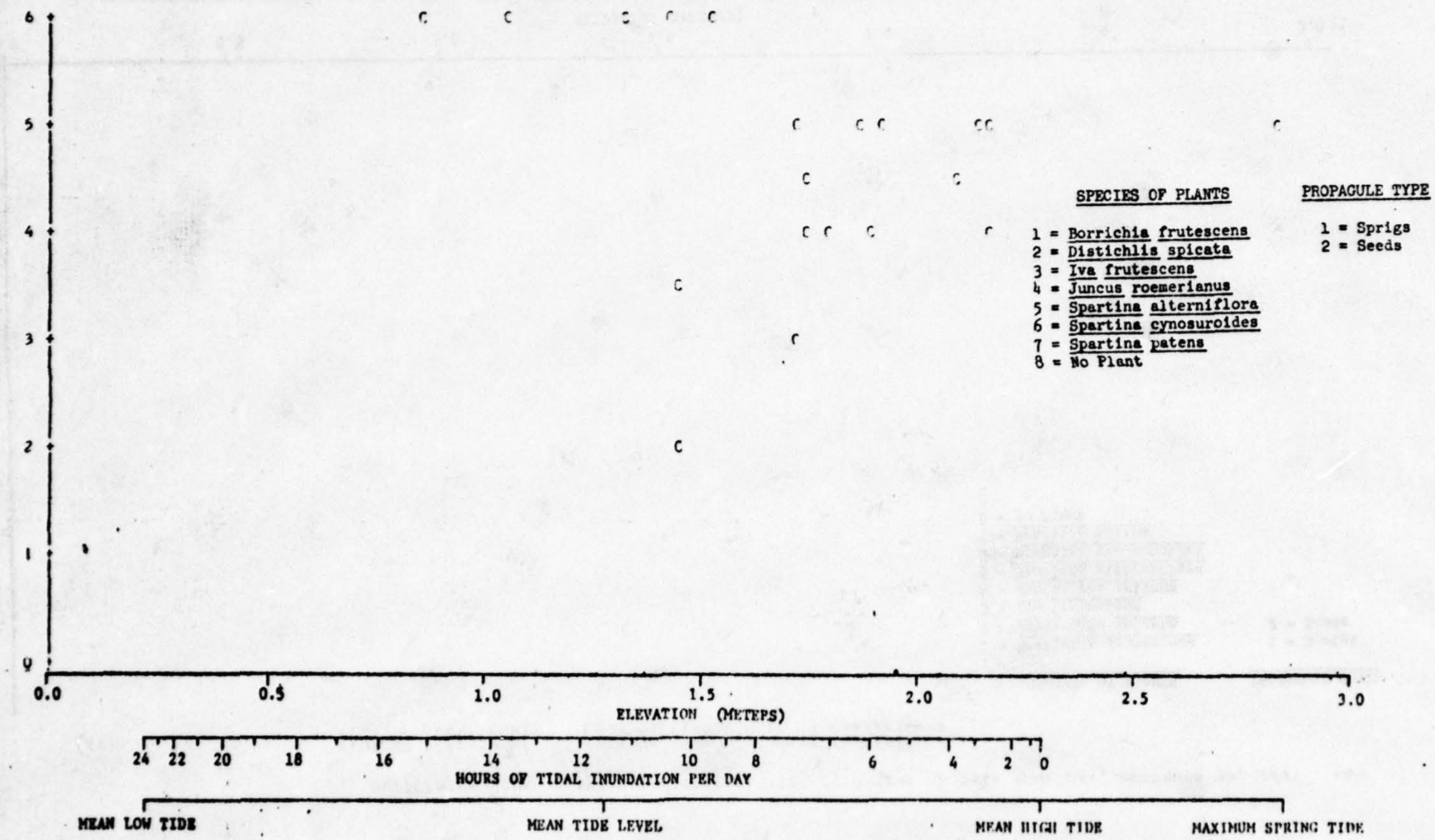
PLOT OF ELEV*STEM_D LEGEND: SYMBOL USED IS CHARACTER *
PLOT OF ELEV*CRAB_BUR LEGEND: SYMBOL USED IS CHARACTER 0



D146

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 2:44 THURSDAY, DECEMBER 22, 1977 48
SPECIES=1 PROP=2

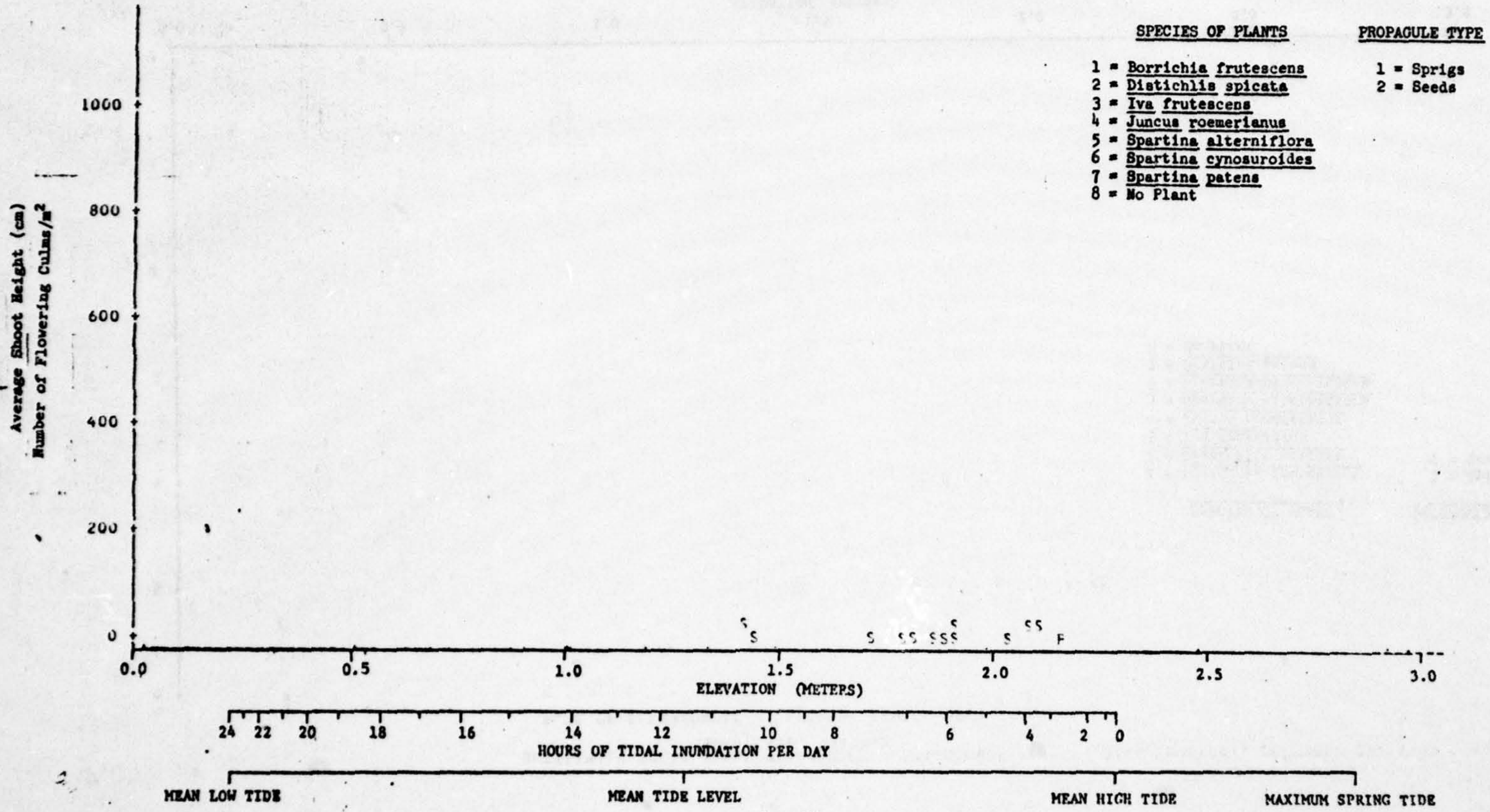
PLOT OF ELEV*CONDIT LEGEND: SYMBOL USED IS C



D147

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 2:44 THURSDAY, DECEMBER 22, 1977 64
SPECIES=1 PROP=2

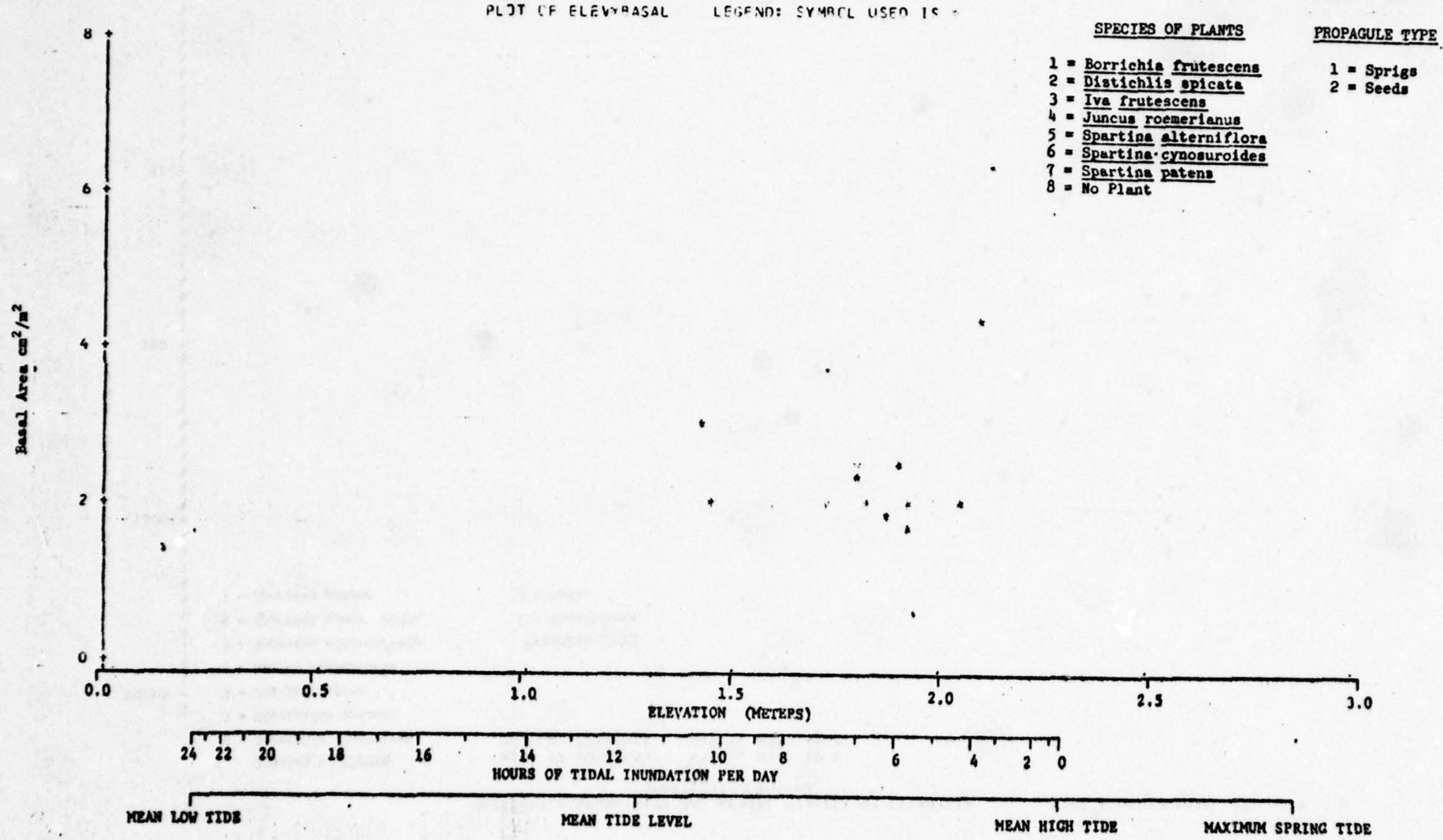
PLOT OF ELEV*SH_HT LEGEND: SYMBOL USED IS CHARACTER S
PLOT OF ELEV*FLOWER LEGEND: SYMBOL USED IS CHARACTER F



D148

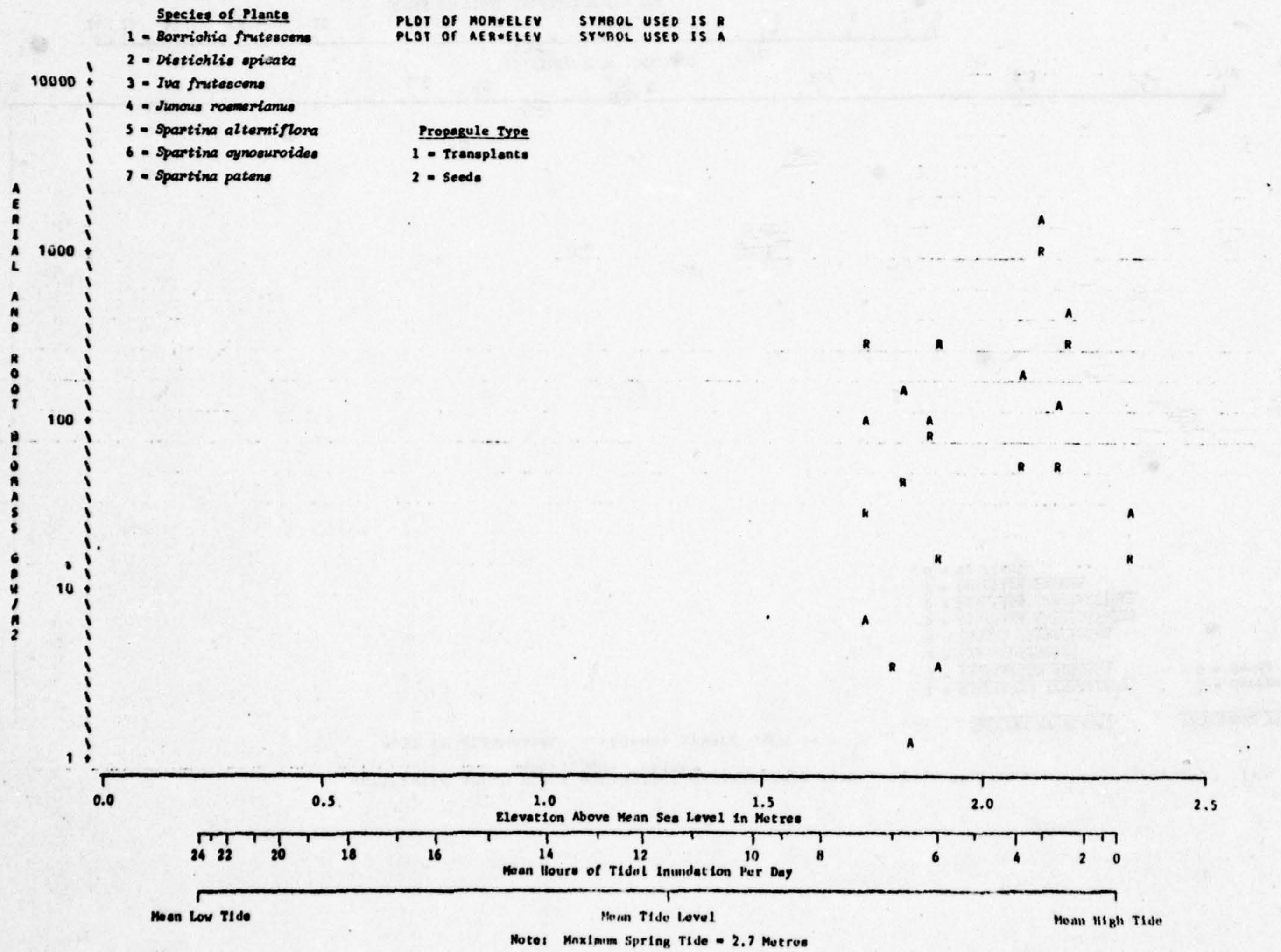
BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 2:44 THURSDAY, DECEMBER 22, 1977 112
SPECIES=1 PROP=2

PLOT OF ELEV*BASAL LEGEND: SYMBOL USED IS *



D149

BUTTERMILK SOUND ROOT AND AERIAL BIOMASS BY ELEVATION 9:14 MONDAY, APRIL 17, 1978 19
SPECIES=1 PROP=2

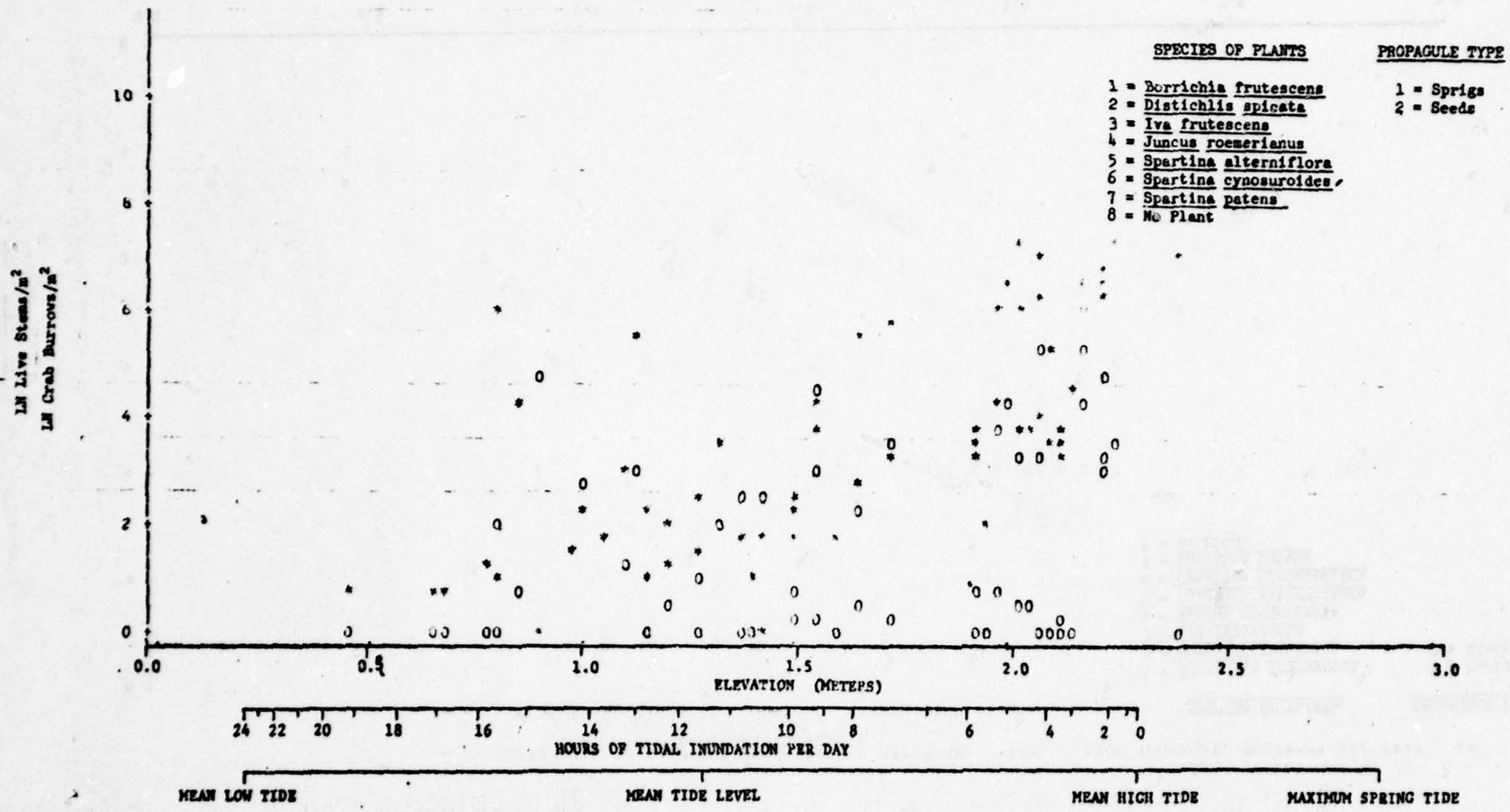


D150

NATURAL LOGARITHMIC PLOT IF CULM DENSITY AND CRAB BURROWS DENSITY WITH TIME 2:44 THURSDAY, DECEMBER 22, 1977 33

SPECIES=2 PROP=1

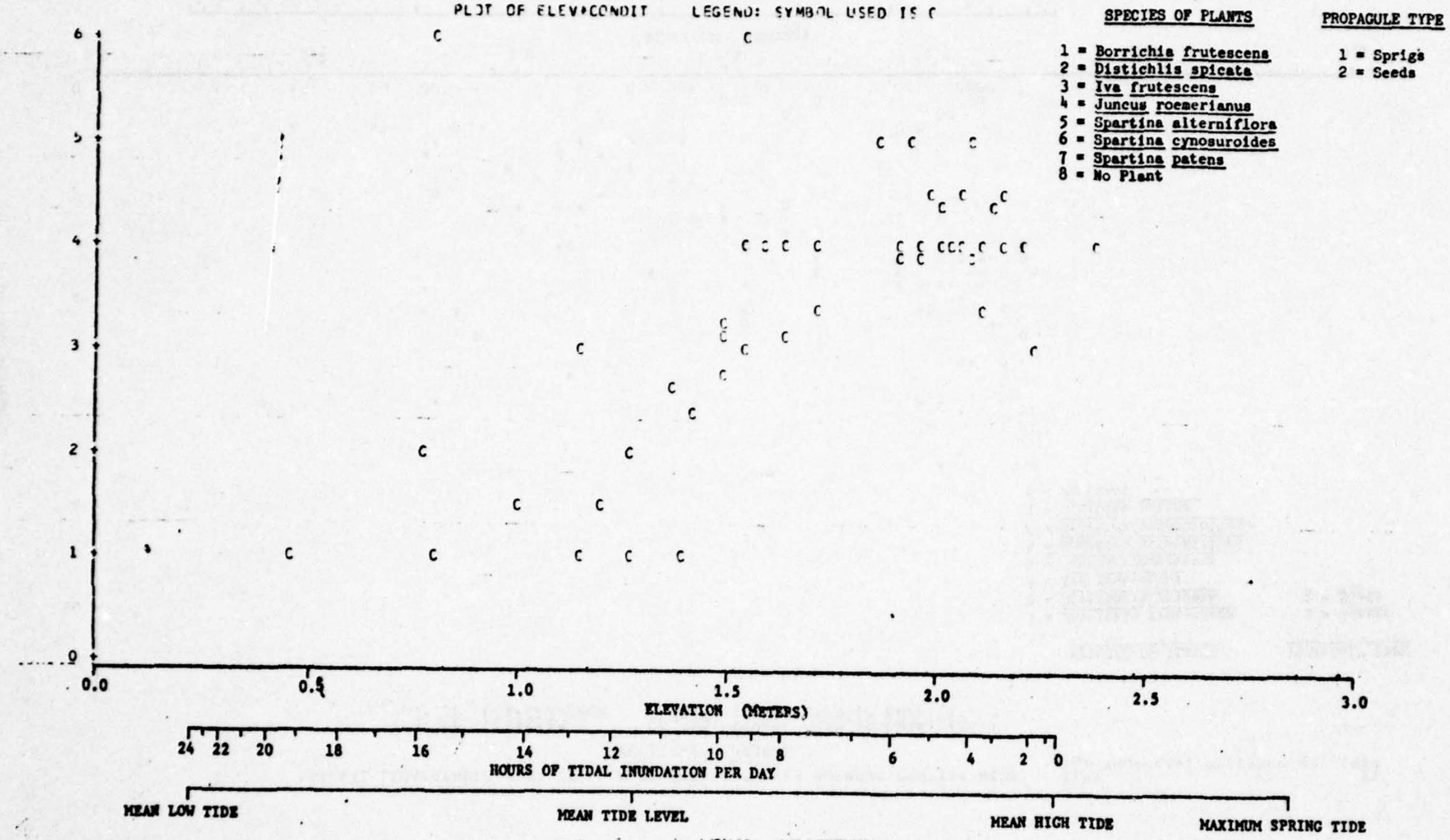
PLOT OF ELEV*STEM_D LEGEND: SYMBOL USED IS CHARACTER *
PLOT OF ELEV*CRAB_BUR LEGEND: SYMBOL USED IS CHARACTER 0



D151

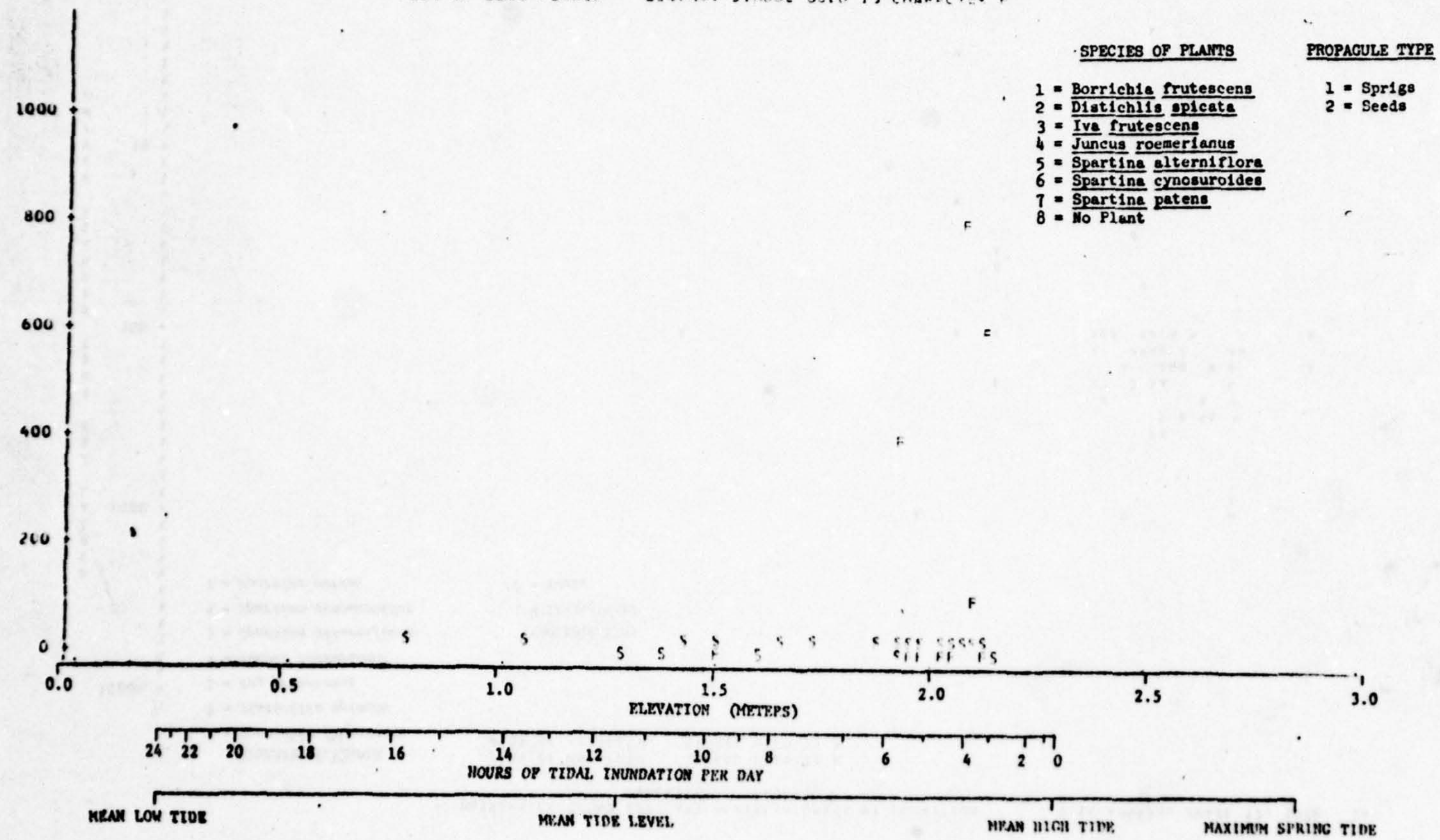
BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 2:44 THURSDAY, DECEMBER 22, 1977 49
SPECIES=2 PROP=1

PLOT OF ELEV*CONDIT LEGEND: SYMBOL USED IS C



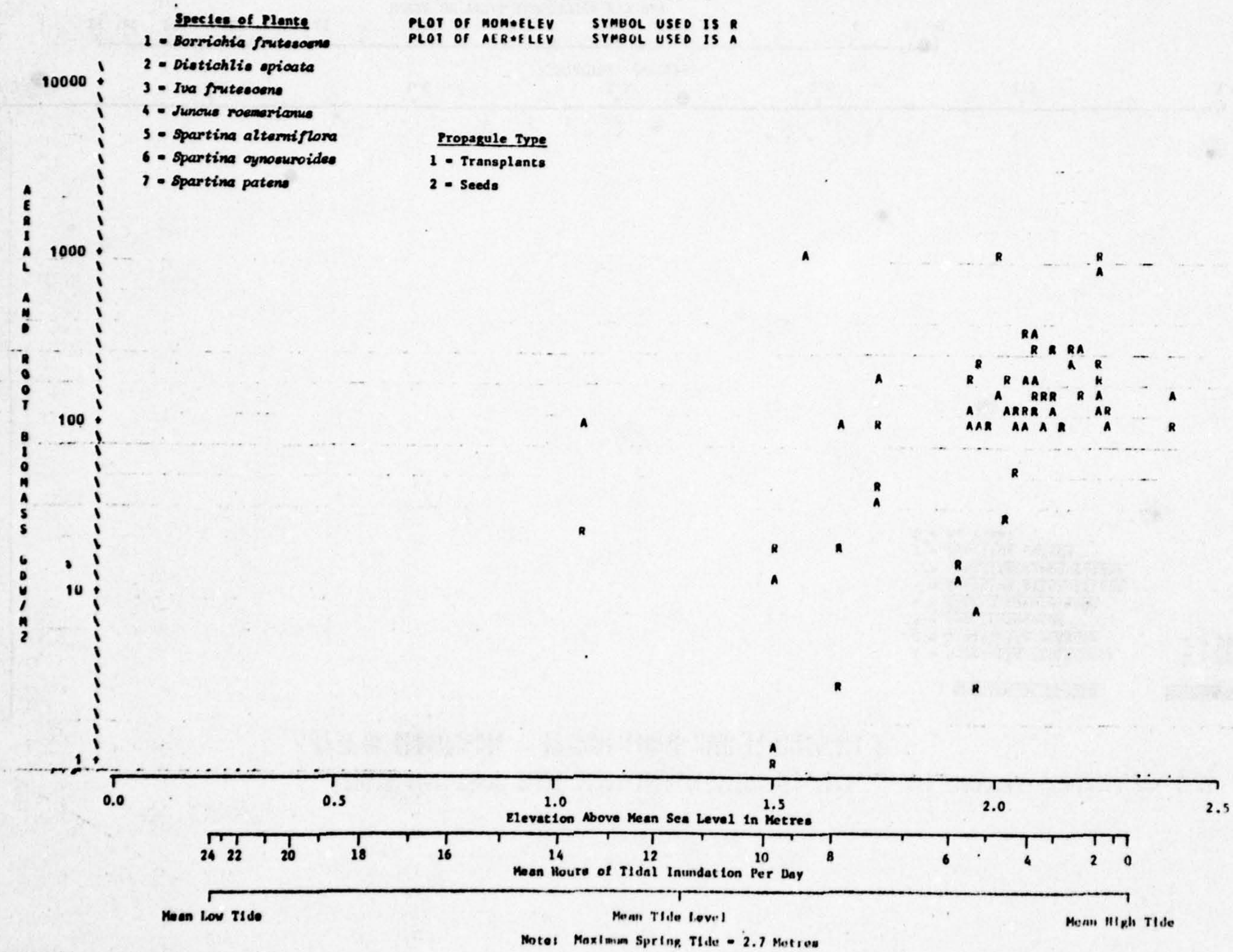
BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   2:44 THURSDAY, DECEMBER 22, 1977   65
SPECIES=2   PROP=1

PLOT OF ELEV*SH_HT   LEGEND: SYMBOL USED IS CHARACTER S
PLOT OF ELEV*FLOWER   LEGEND: SYMBOL USED IS CHARACTER F



BUTTERMILK SOUND ROOT AND AERIAL BIOMASS BY ELEVATION 9:14 MONDAY, APRIL 17, 1978 20

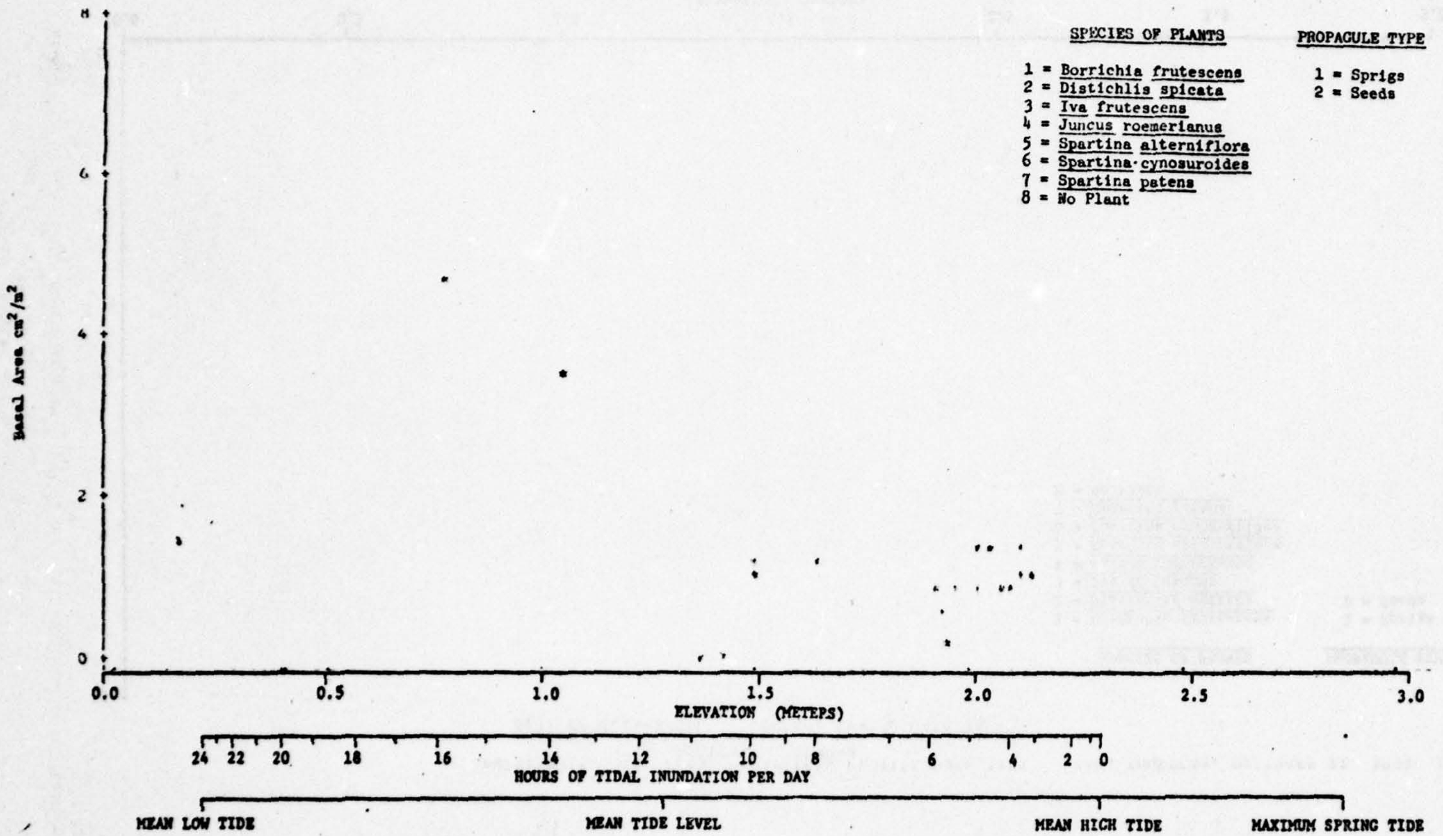
SPECIES=7 PROP=1



D154

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   2:44 THURSDAY, DECEMBER 22, 1977 113
SPECIES=2   PROP=1

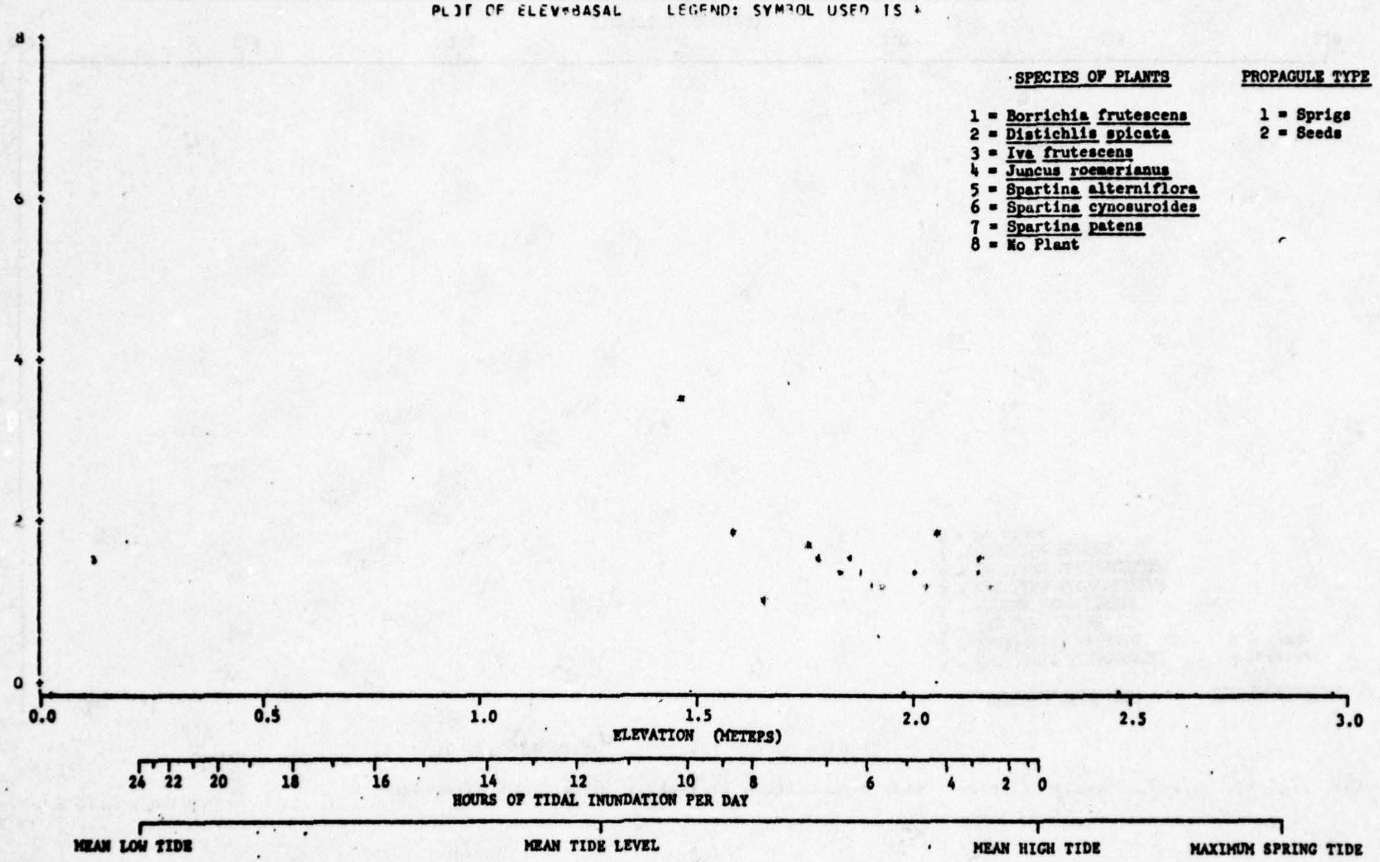
PLOT OF ELEV*BASAL   LEGEND: SYMBOL USED IS *



D155

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   2:44 THURSDAY, DECEMBER 22, 1977 114
SPECIES=2 PROP=2

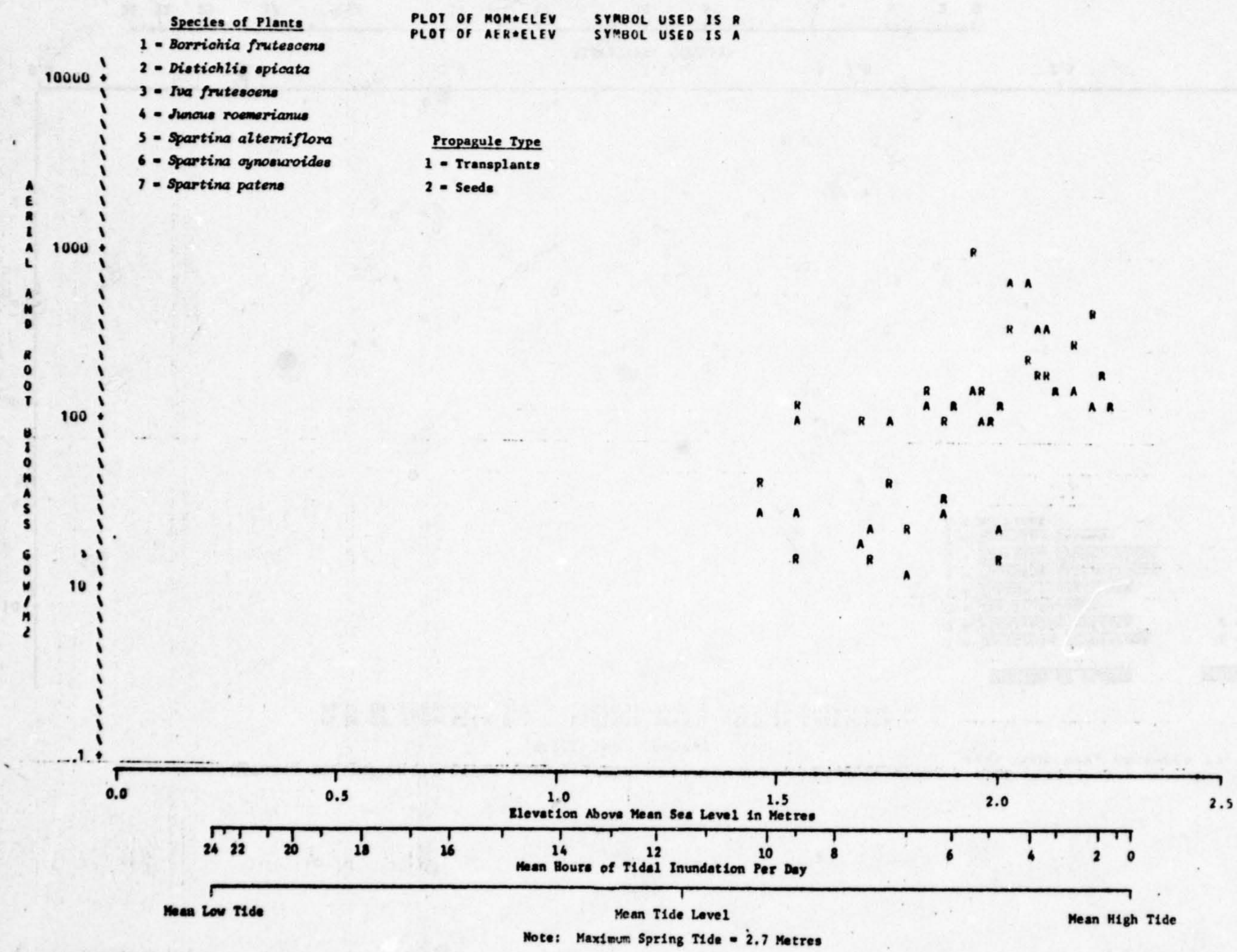
PLOT OF ELEV*BASAL   LEGEND: SYMBOL USED IS +



D156

BUTTERMILK SOUND ROOT AND AERIAL BIOMASS BY ELEVATION 9:14 MONDAY, APRIL 17, 1978 21

SPECIES=2 PROP=2



D157

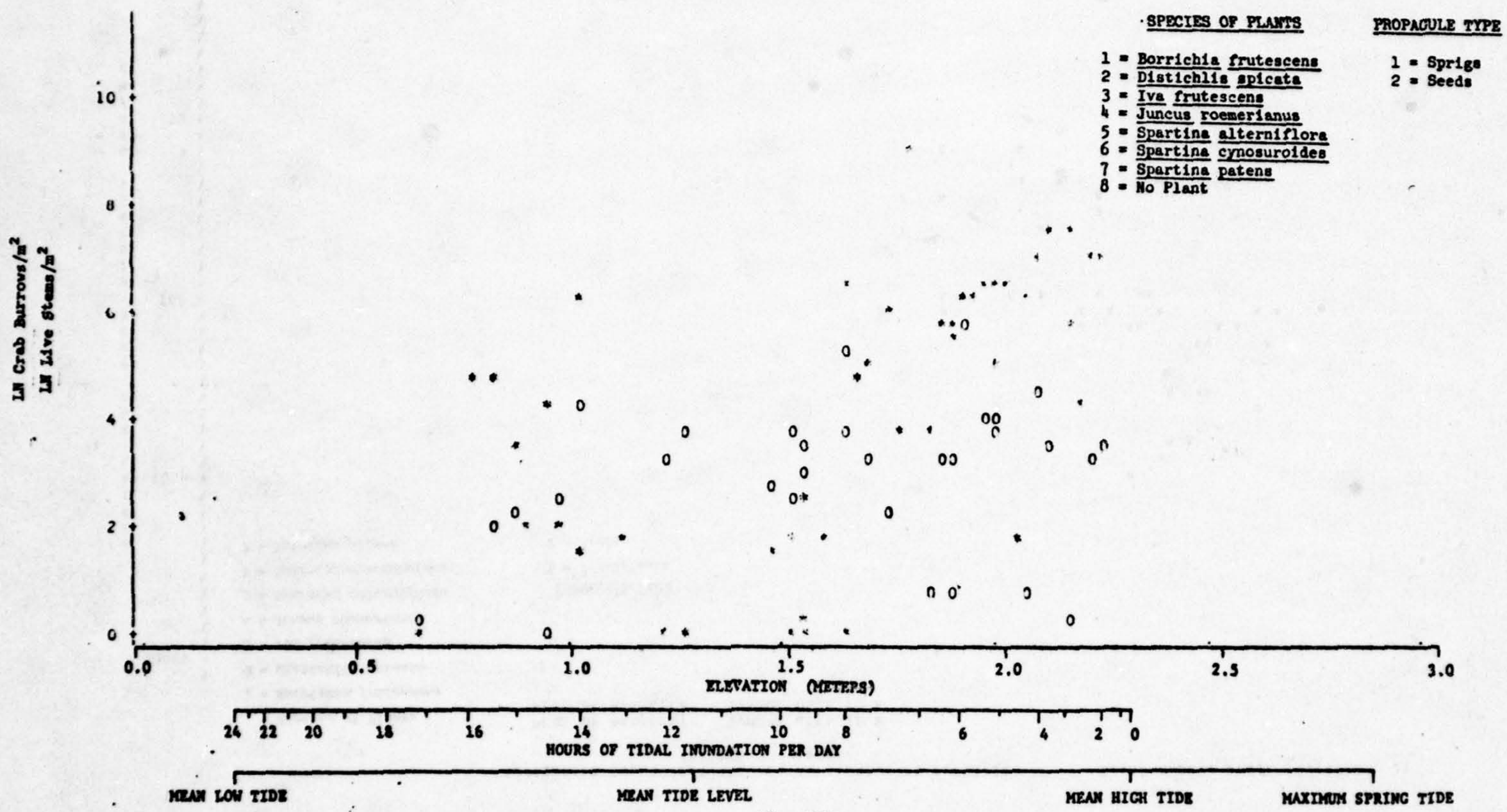
NATURAL LOGARITHMIC PLOT IF CULM DENSITY AND CRAB BURROWS DENSITY WITH TIME

34

2:44 THURSDAY, DECEMBER 22, 1977

SPECIES=2 PROP=2

PLOT OF ELEV*STEM_C LEGEND: SYMBOL USED IS CHARACTER *
PLOT OF ELEV*CRAB_BUR LEGEND: SYMBOL USED IS CHARACTER O



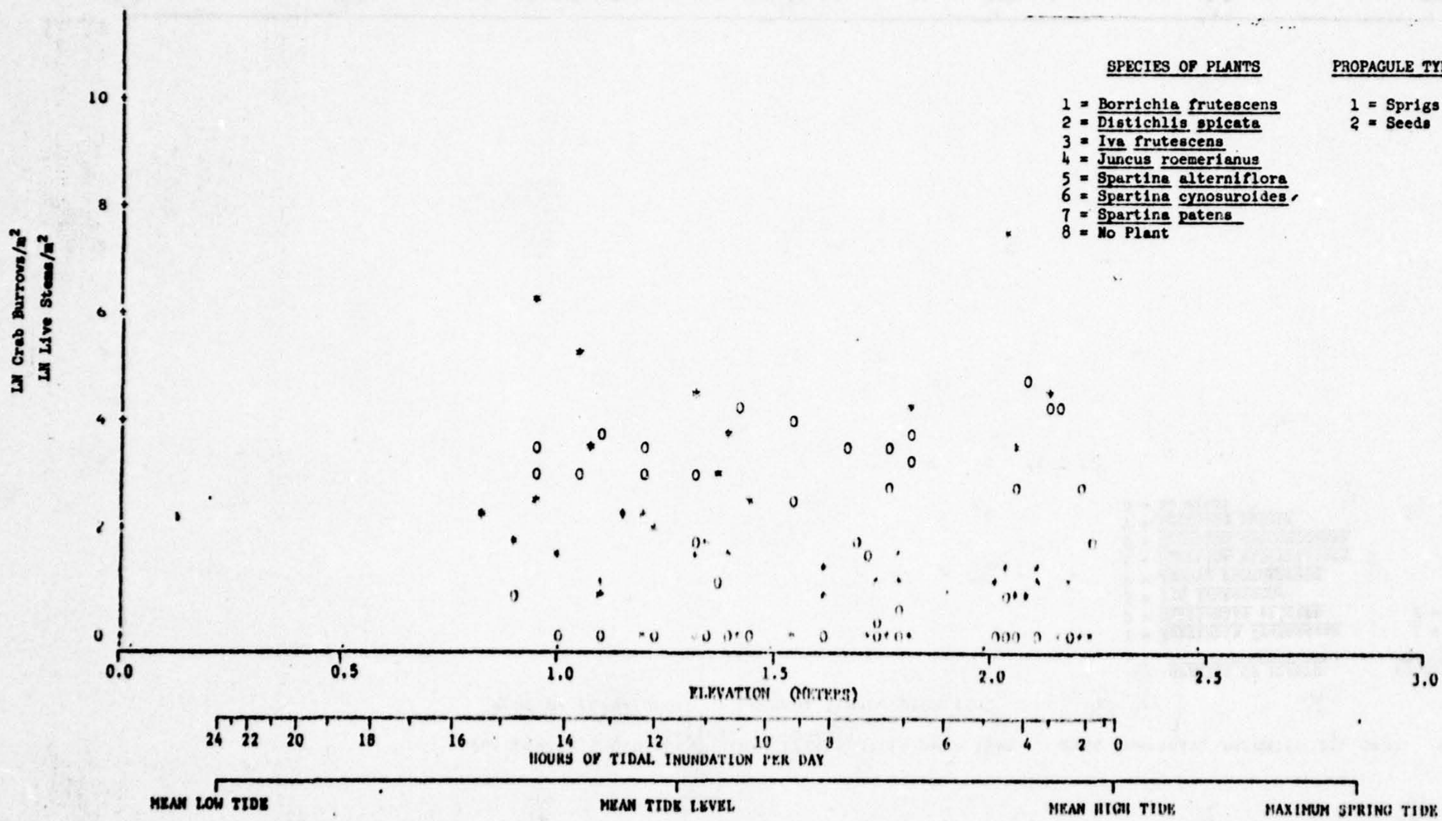
D158

NATURAL LOGARITHMIC PLOT IF CULM DENSITY AND CRAB BURROWS DENSITY WITH TIME

2:44 THURSDAY, DECEMBER 22, 1977 35

SPECIES=3 PROP=1

PLOT OF ELEV*STEM_C LEGEND: SYMBOL USED IS CHARACTER *
PLOT OF ELEV*CRAB_BUR LEGEND: SYMBOL USED IS CHARACTER 0



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

PROPAGULE TYPE

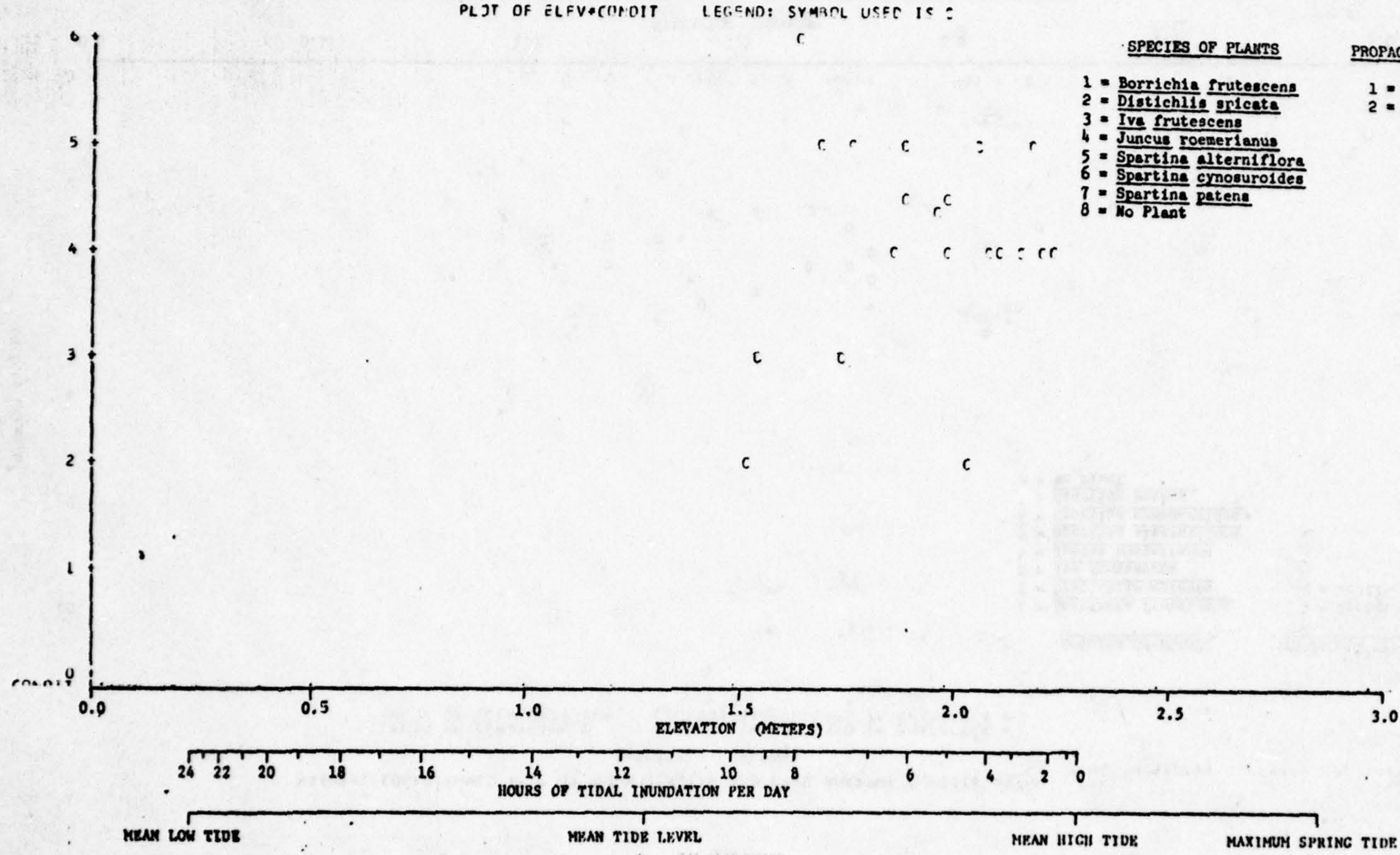
1 = Sprigs
2 = Seeds

D159

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   2:44 THURSDAY, DECEMBER 22, 1977   50

SPECIES=2 PROP=2

PLOT OF ELEV*CONDIT   LEGEND: SYMBOL USED IS C



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

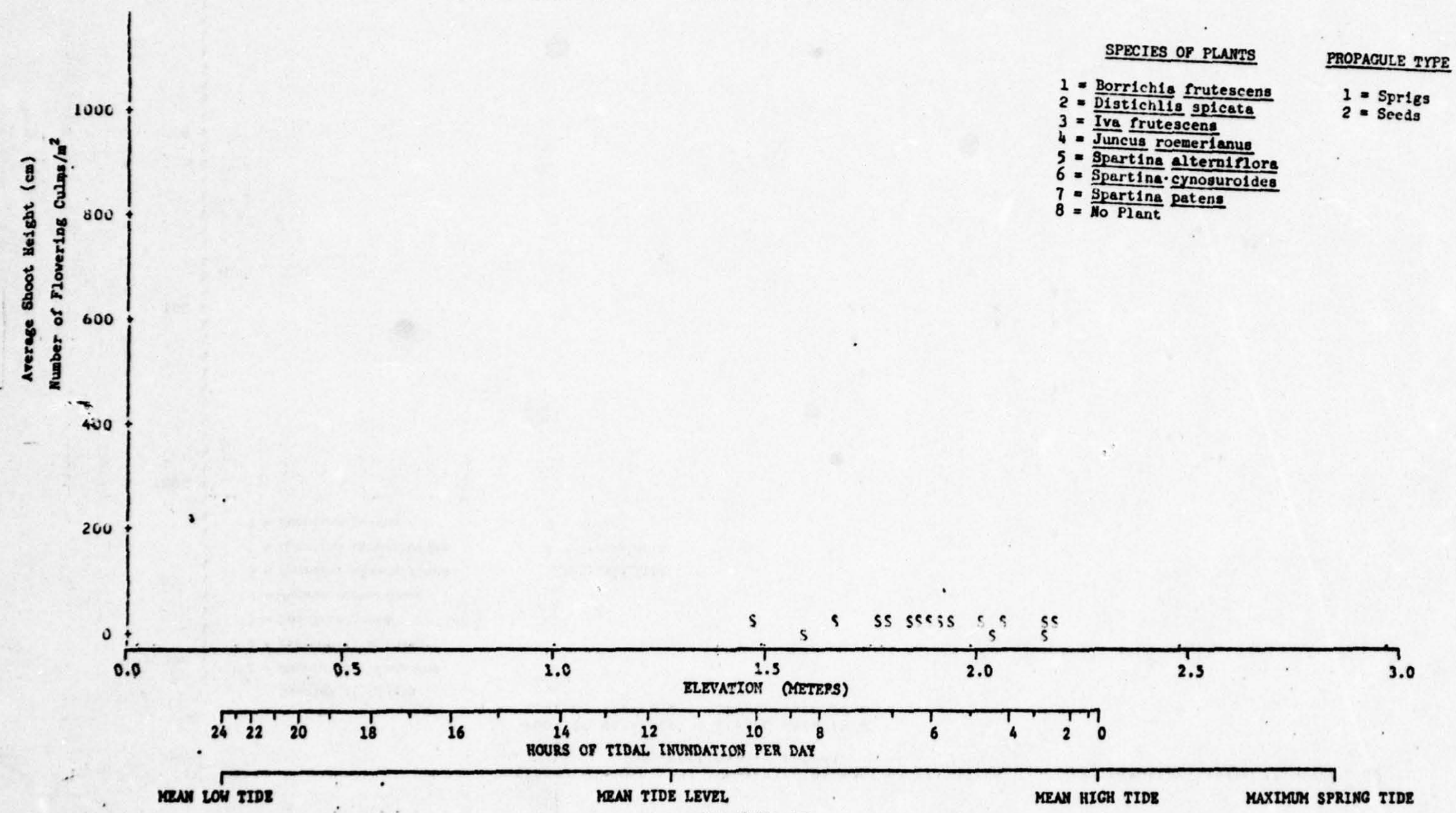
PROPAGULE TYPE

1 = Sprigs
2 = Seeds

D160

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 2:44 THURSDAY, DECEMBER 22, 1977 56
SPECIES=2 PROP=2

PLOT OF ELEV*SH_HT LEGEND: SYMBOL USED IS CHARACTER S
PLOT OF ELEV*FLOWER LEGEND: SYMBOL USED IS CHARACTER F



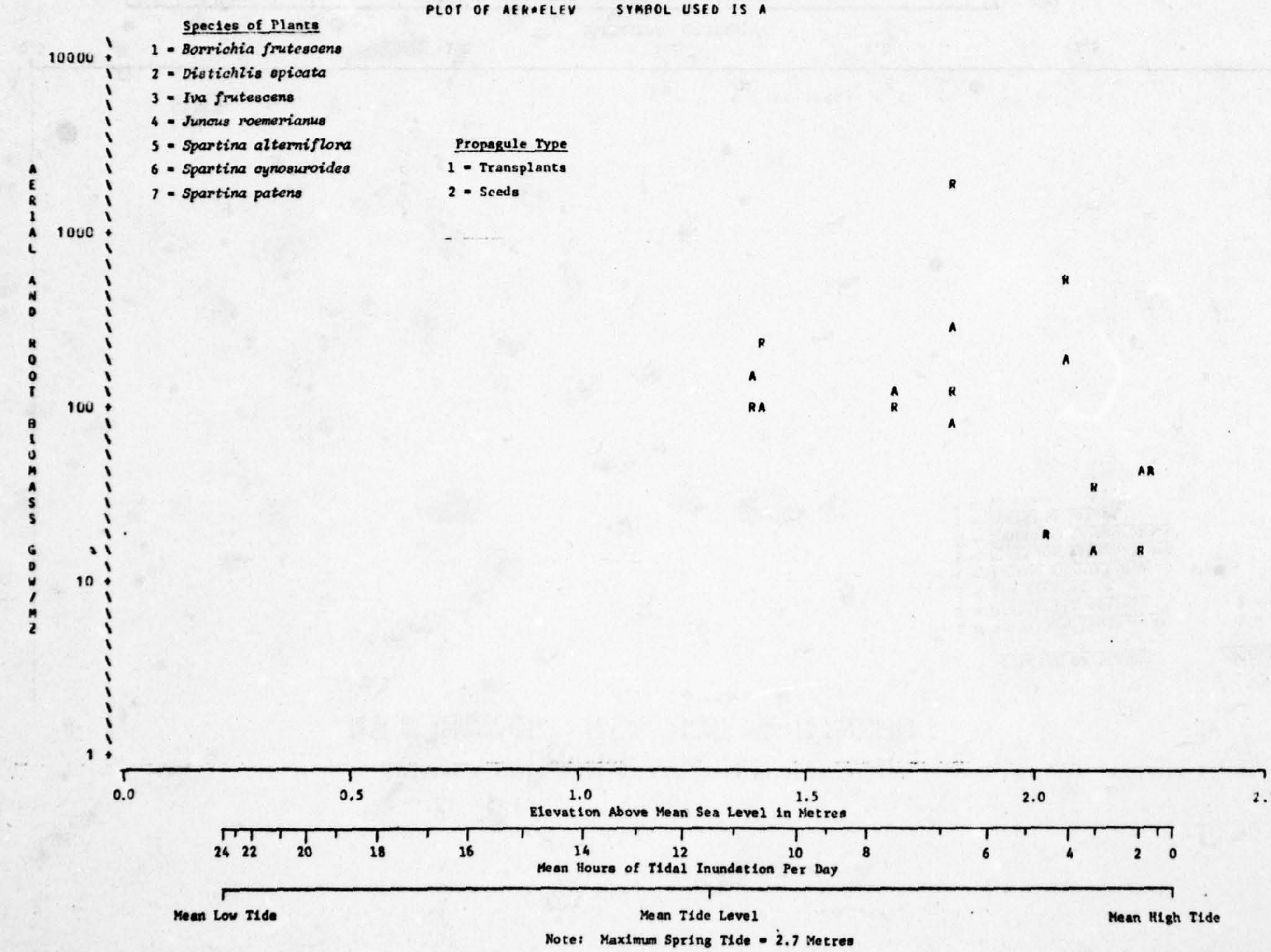
D161

BUTTERMILK SOUND ROOT AND AERIAL BIOMASS BY ELEVATION 9:14 MONDAY, APRIL 17, 1978 22

SPECIES=3 PROP=1

PLOT OF ROM*ELEV SYMBOL USED IS R

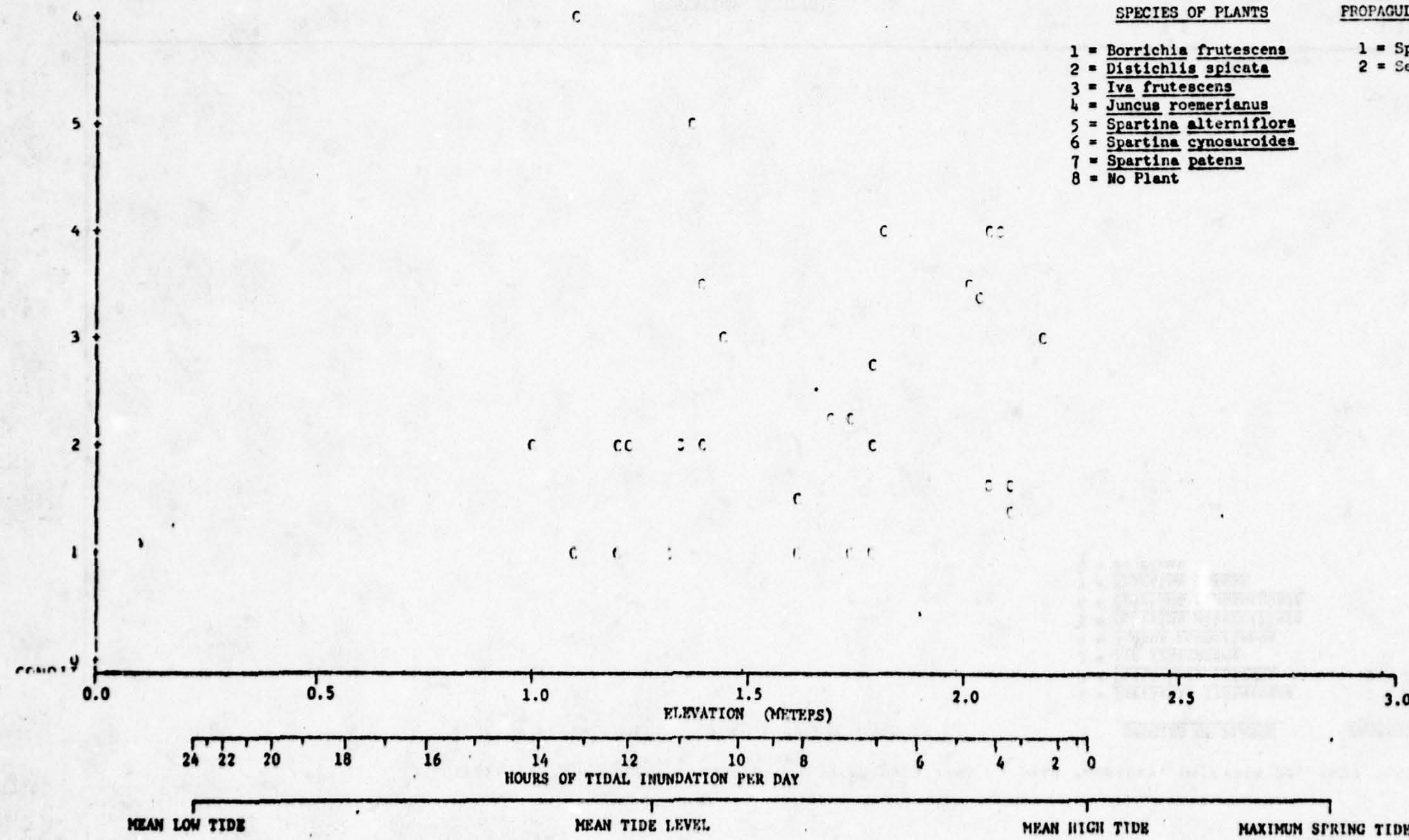
PLOT OF AER*ELEV SYMBOL USED IS A



D162

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 2:44 THURSDAY, DECEMBER 22, 1977 51
SPECIES=3 PROP=1

PLOT OF ELEV*CONDIT LEGEND: SYMBOL USED IS C



SPECIES OF PLANTS

1 = Borrichia frutescens
2 = Distichlis spicata
3 = Iva frutescens
4 = Juncus roemerianus
5 = Spartina alterniflora
6 = Spartina cynosuroides
7 = Spartina patens
8 = No Plant

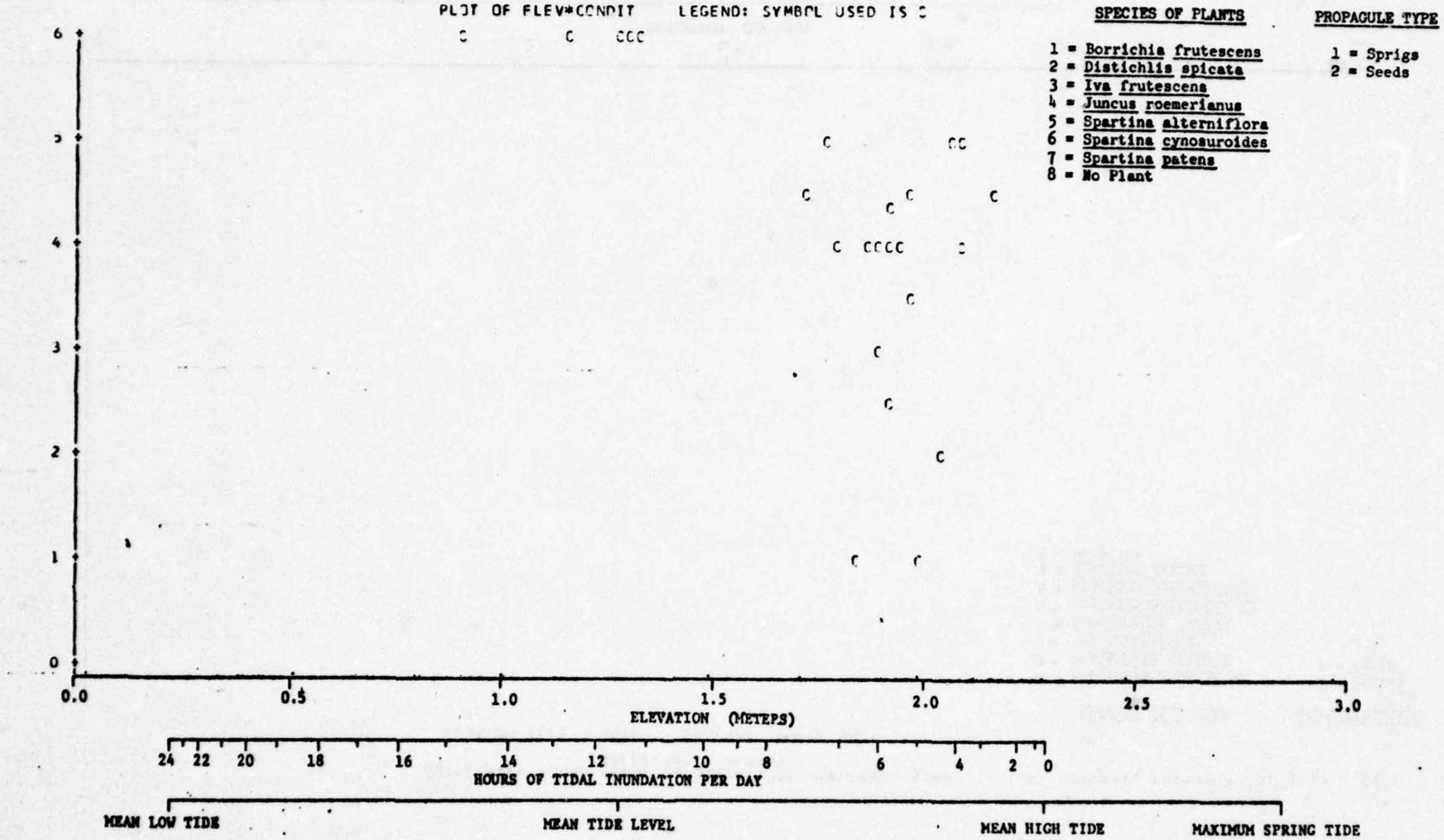
PROPAGULE TYPE

1 = Sprigs
2 = Seeds

D163

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   2:44 THURSDAY, DECEMBER 22, 1977   52
SPECIES=3   PROP=2

PLOT OF ELEV*CONDIT   LEGEND: SYMBOL USED IS C

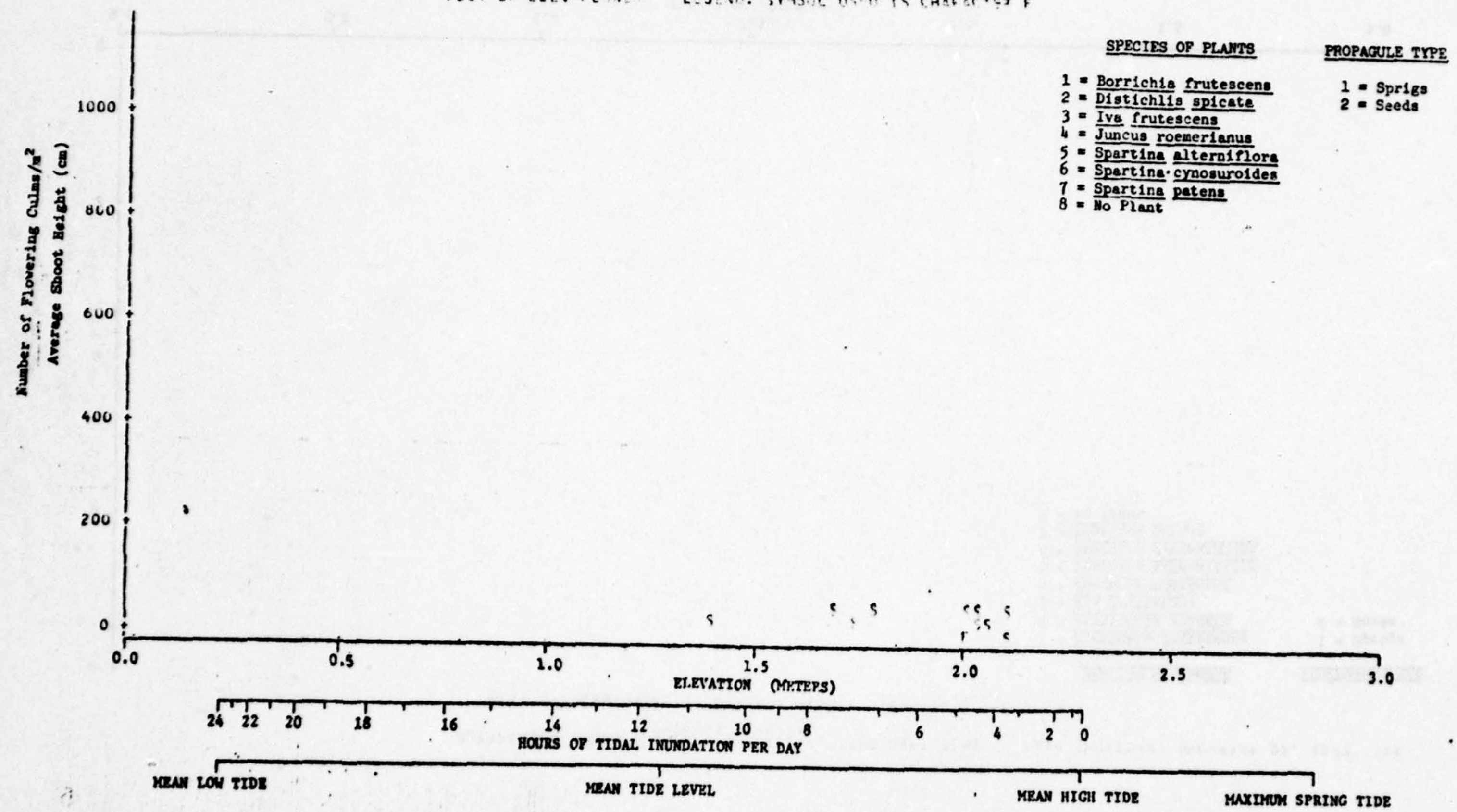


D164

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 2:44 THURSDAY, DECEMBER 22, 1977 67
SPECIES=3 PROP=1

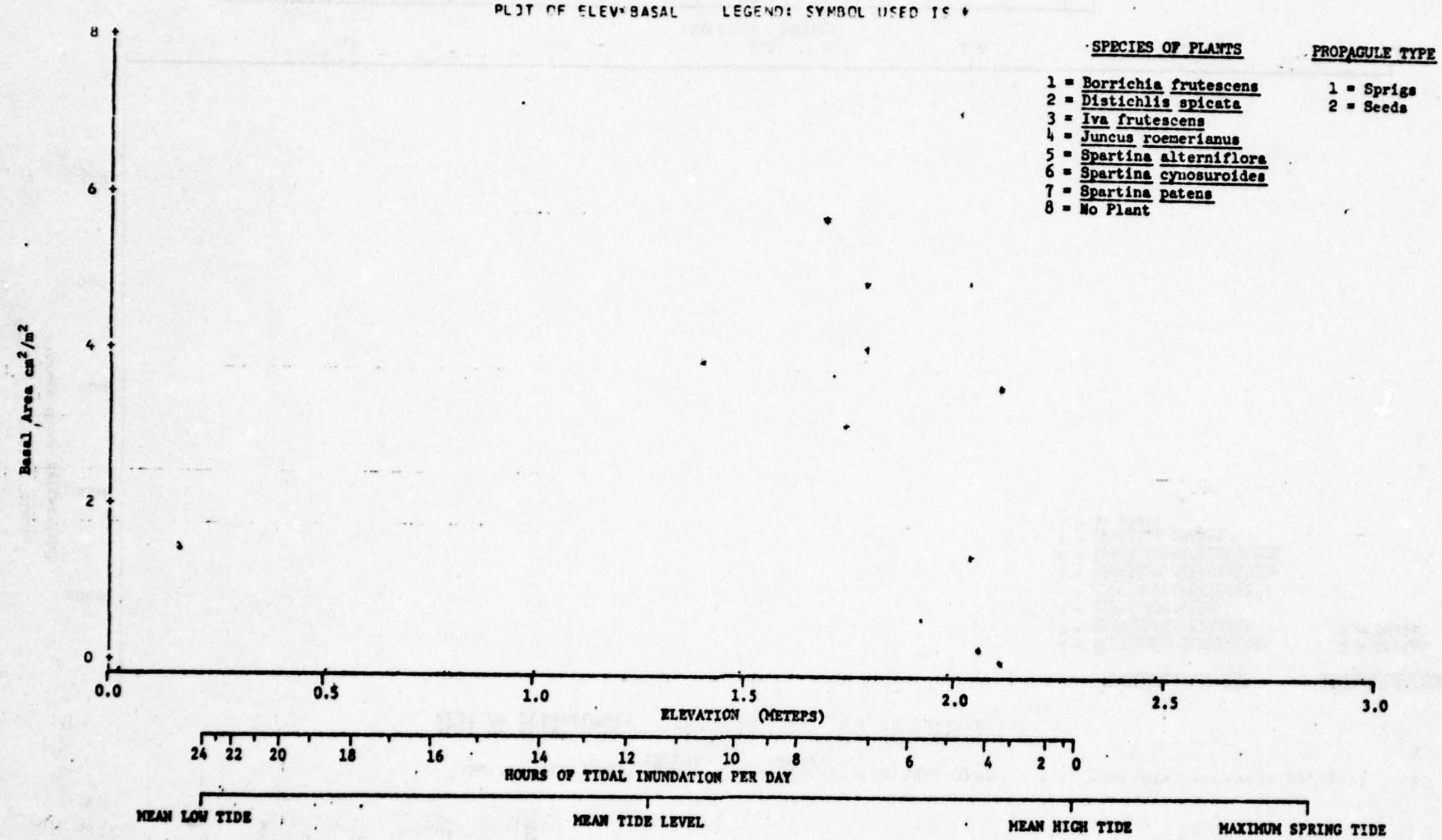
PLOT OF ELEV*SH_HT LEGEND: SYMBOL USED IS CHARACTER S
PLOT OF ELEV*FLOWER LEGEND: SYMBOL USED IS CHARACTER F

D165

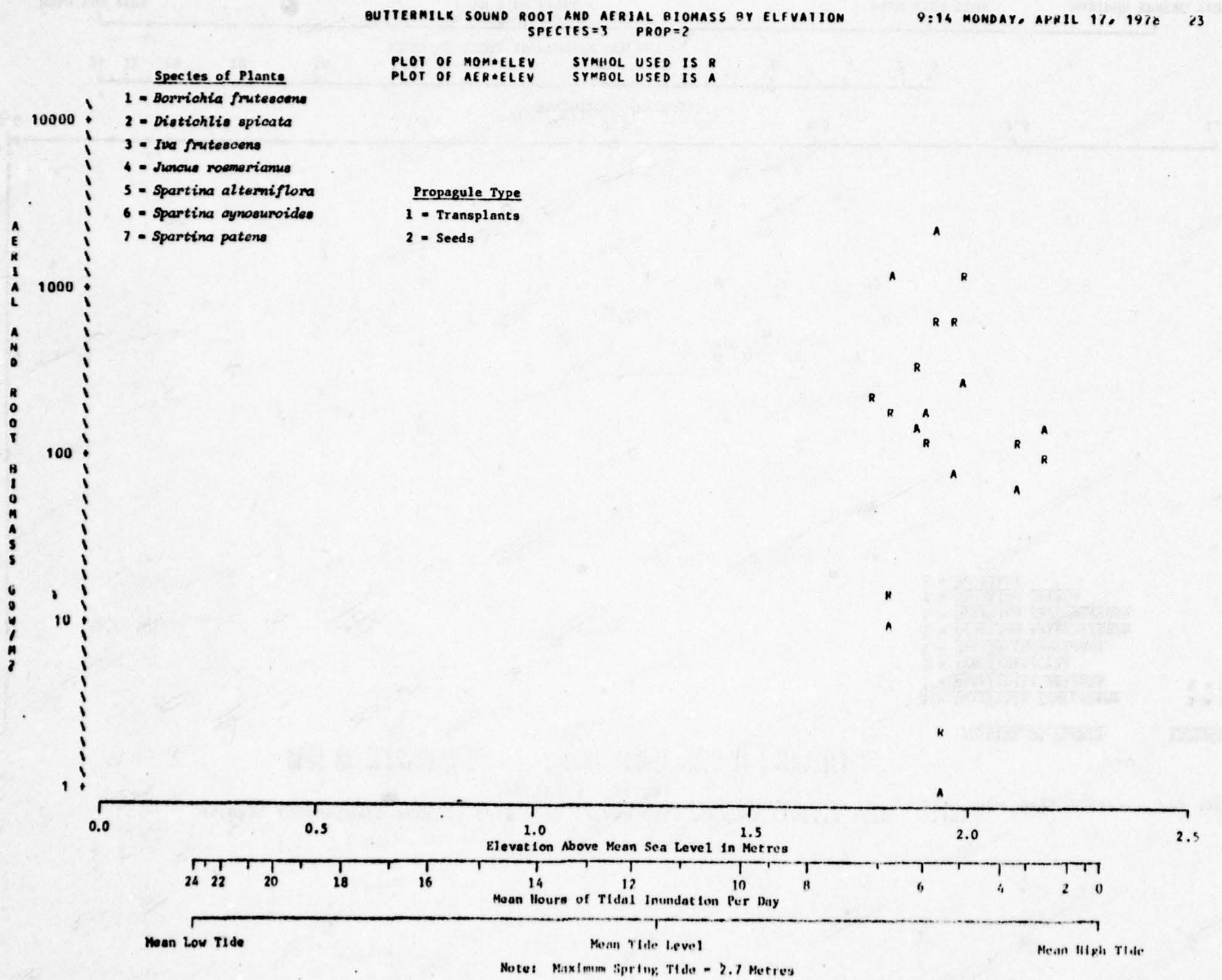


BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 2:44 THURSDAY, DECEMBER 22, 1977 115
SPECIES=3 PROP=1

PLOT OF ELEV*BASAL LEGEND: SYMBOL USED IS *



D166



BUTTERMILK SOUND ROOT AND AERIAL BIOMASS BY ELEVATION 9:14 MONDAY, APRIL 17, 1978 23
SPECIES=3 PROP=2
PLOT OF MOM*ELEV SYMBOL USED IS R
PLOT OF AER*ELEV SYMBOL USED IS A
Species of Plants
1 = Borrichia frutescens
2 = Distichlis spicata
3 = Iva frutescens
4 = Juncus roemerianus
5 = Spartina alterniflora
6 = Spartina cynosuroides
7 = Spartina patens
Propagule Type
1 = Transplants
2 = Seeds
AERIAL AND ROOT BIOMASS GDW/M2
10000
1000
100
10
1
0.0
0.5
1.0
1.5
2.0
2.5
Elevation Above Mean Sea Level in Metres
24 22 20 18 16 14 12 10 8 6 4 2 0
Mean Hours of Tidal Inundation Per Day
Mean Low Tide
Mean Tide Level
Mean High Tide
Note: Maximum Spring Tide = 2.7 Metres

D167

NATURAL LOGARITHMIC PLOT IF CULM DENSITY AND CRAB BURROWS DENSITY WITH

SPECIES=3 PROP=2

TIME 2:44 THURSDAY, DECEMBER 22, 1977 36

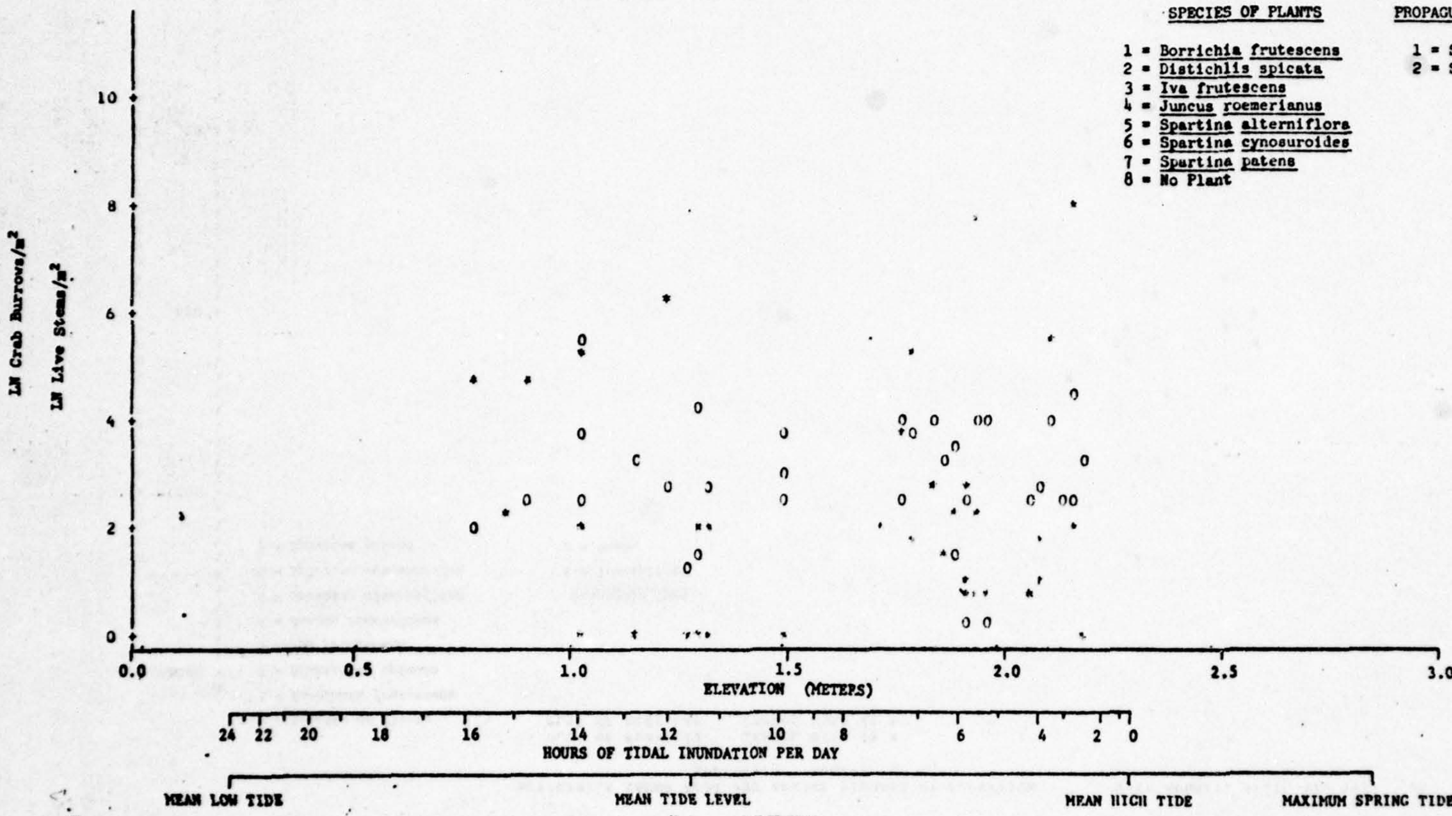
PLOT OF ELEV*STEM_D LEGEND: SYMBOL USED IS CHARACTER *
PLOT OF ELEV*CRAB_BUR LEGEND: SYMBOL USED IS CHARACTER 0

SPECIES OF PLANTS

1 = Borrichia frutescens
2 = Distichlis spicata
3 = Iva frutescens
4 = Juncus roemerianus
5 = Spartina alterniflora
6 = Spartina cynosuroides
7 = Spartina patens
8 = No Plant

PROPAGULE TYPE

1 = Sprigs
2 = Seeds

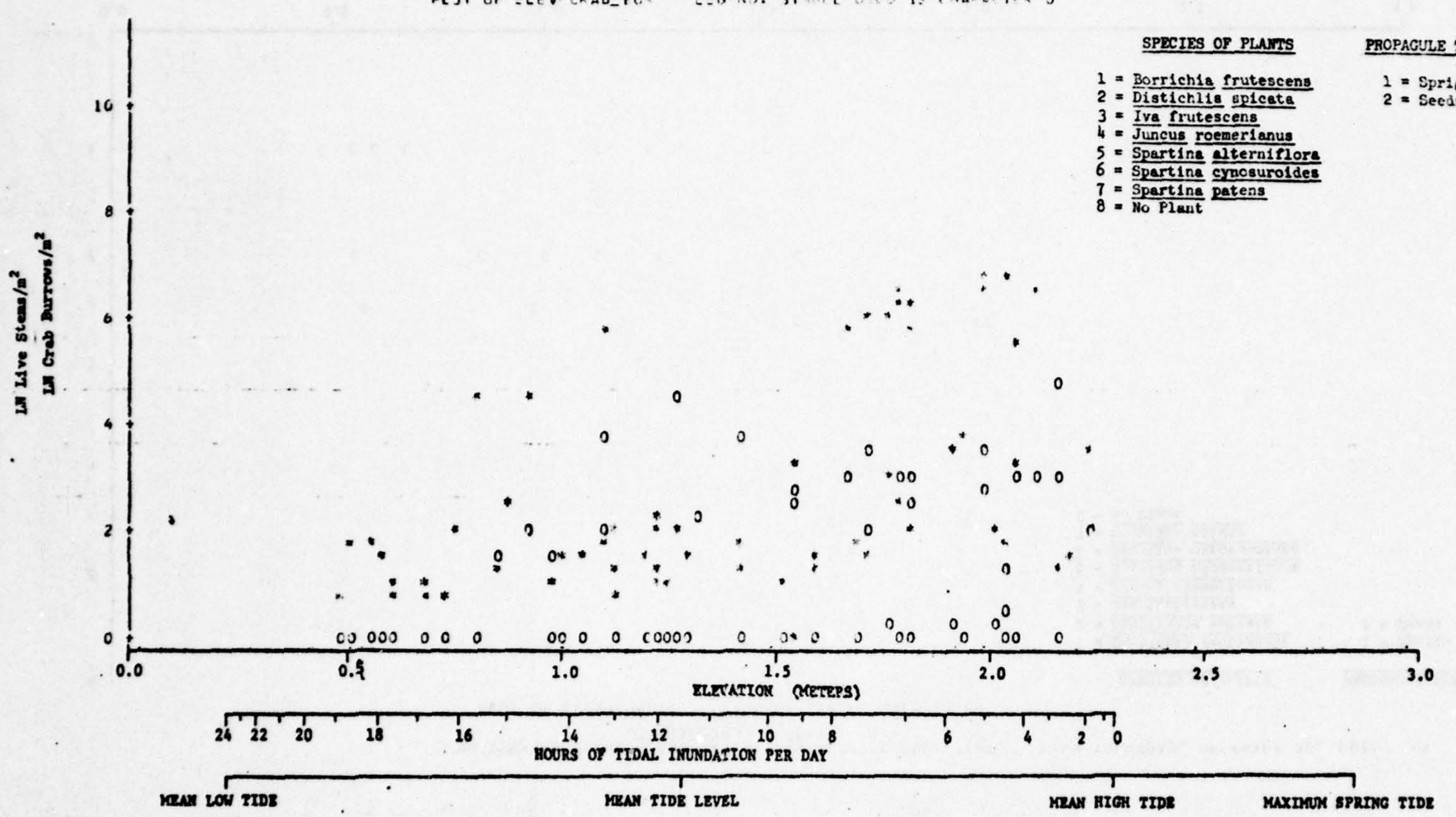


D168

NATURAL LOGARITHMIC PLOT OF CULM DENSITY AND CRAB BURROWS DENSITY WITH TIME 2:44 THURSDAY, DECEMBER 22, 1977 37

SPECIES=4 PROP=1

PLOT OF ELEV*STEM_D LEGEND: SYMBOL USED IS CHARACTER *
PLOT OF ELEV*CRAB_BUR LEGEND: SYMBOL USED IS CHARACTER O



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

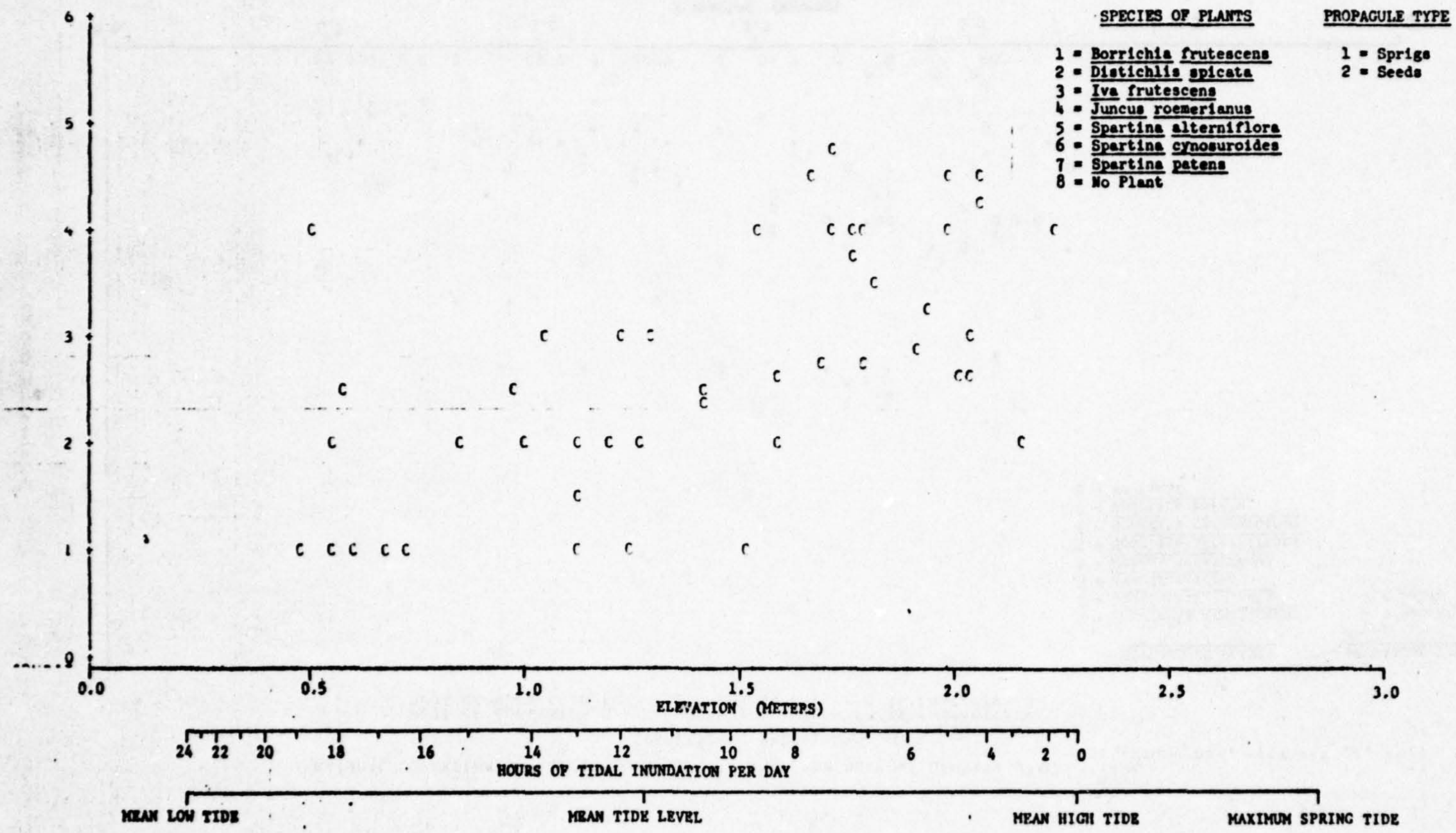
PROPAGULE TYPE

1 = Sprigs
2 = Seeds

D169

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   2:44 THURSDAY, DECEMBER 22, 1977   53
SPECIES=4   PROP=1

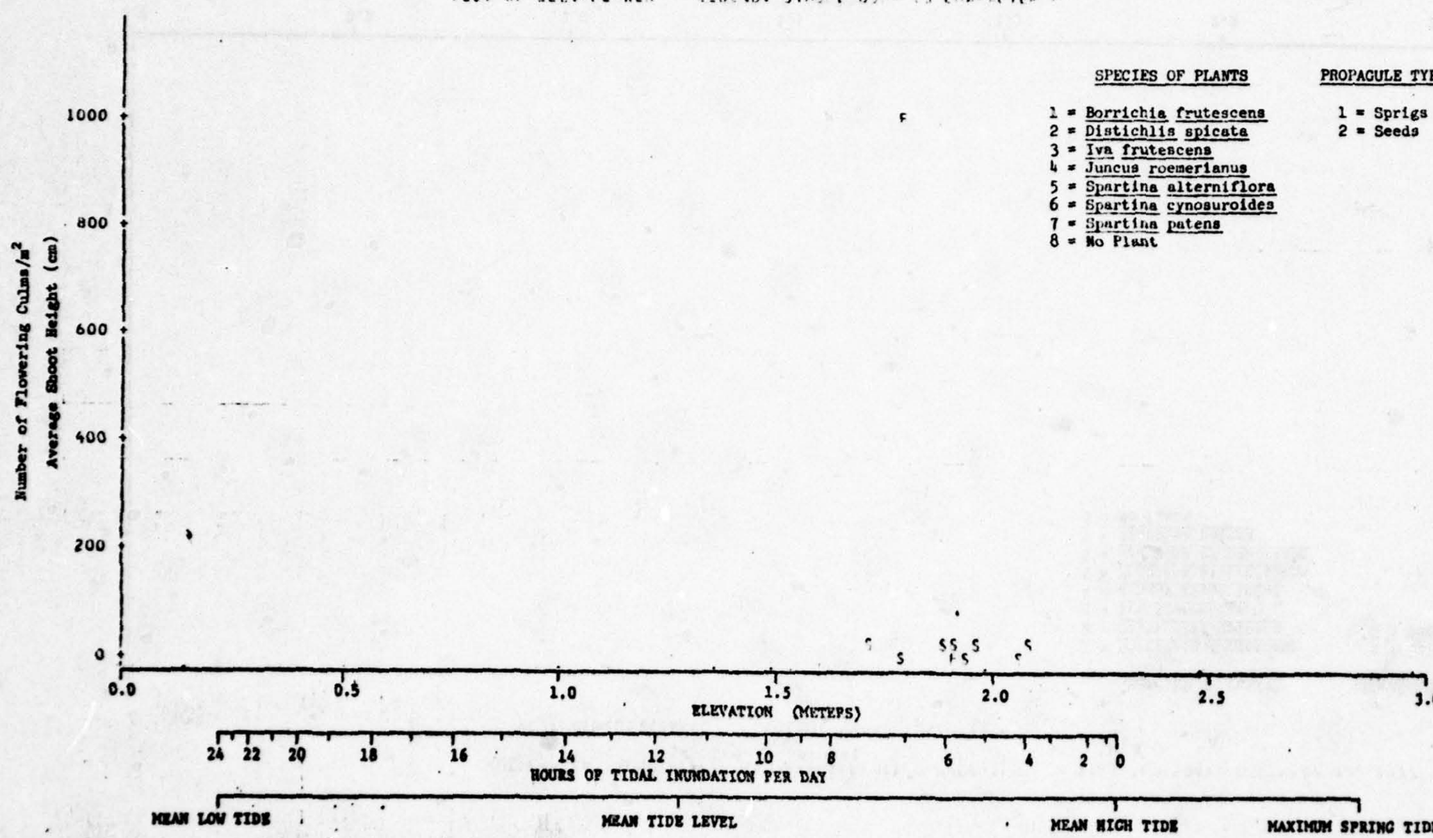
PLOT OF ELEV*CONDIT   LEGEND: SYMBOL USED IS C



D170

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   2:44 THURSDAY, DECEMBER 22, 1977   58
SPECIES=3   PROP=2

PLOT OF ELEV*SH_HT   LEGEND: SYMBOL USED IS CHARACTER S
PLOT OF ELEV*FLOWER   LEGEND: SYMBOL USED IS CHARACTER F



SPECIES OF PLANTS

1 = Borrichia frutescens
2 = Distichlis spicata
3 = Iva frutescens
4 = Juncus roemerianus
5 = Spartina alterniflora
6 = Spartina cynosuroides
7 = Spartina patens
8 = No Plant

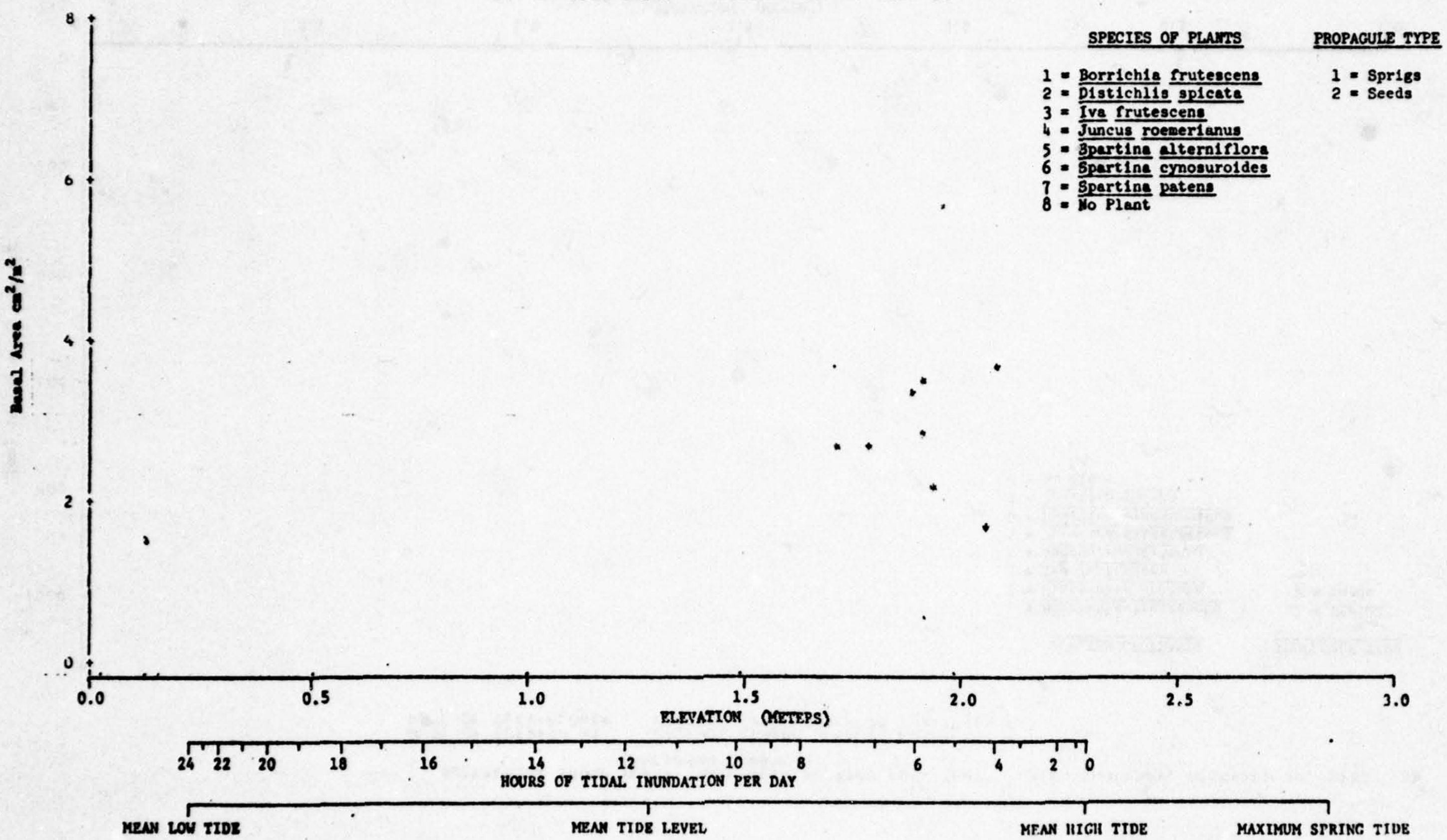
PROPAGULE TYPE

1 = Sprigs
2 = Seeds

D171

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 2:44 THURSDAY, DECEMBER 22, 1977 116
SPECIES=3 PROP=2

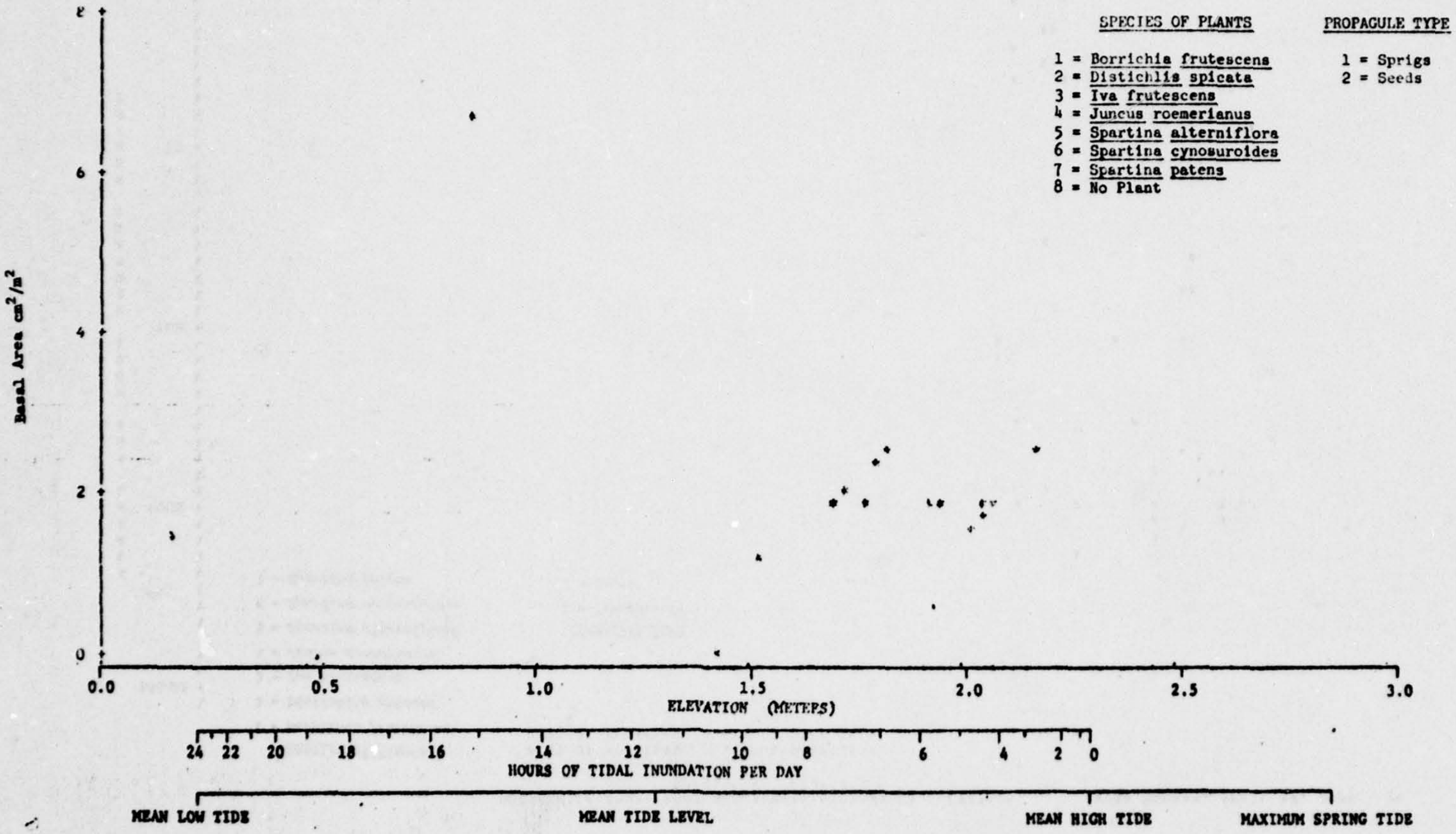
PLOT OF ELEV*BASAL LEGEND: SYMBOL USED IS *



D172

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 2:44 THURSDAY, DECEMBER 22, 1977 117
SPECIES=4 PROP=1

PLOT OF ELEV*BASAL LEGEND: SYMBOL USED IS *



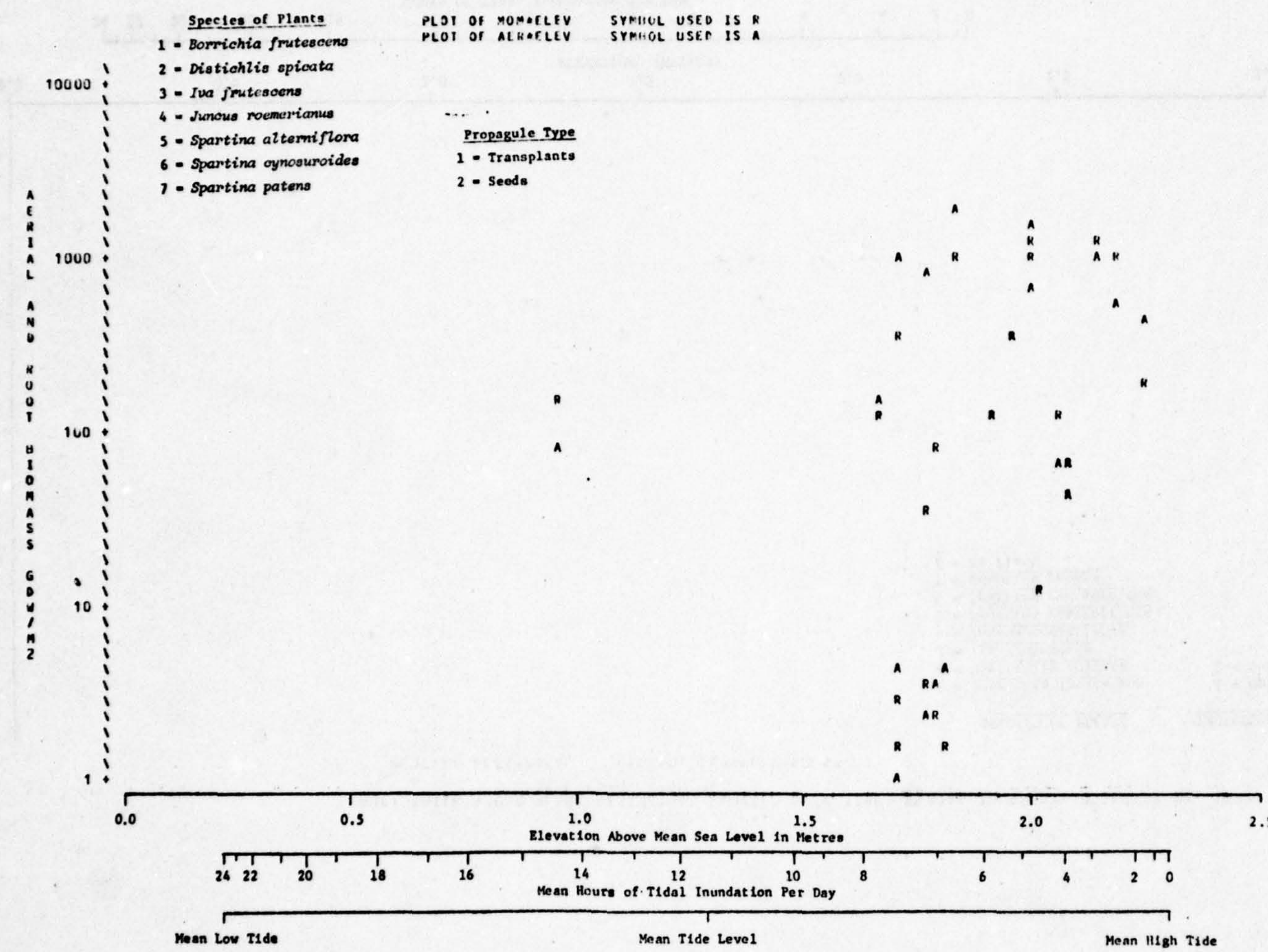
D173

BUTTERMILK SOUND ROOT AND AERIAL BIOMASS BY ELEVATION 9:14 MONDAY, APRIL 17, 1978 24

SPECIES=4 PROP=1

PLOT OF ROM*ELEV SYMBOL USED IS R

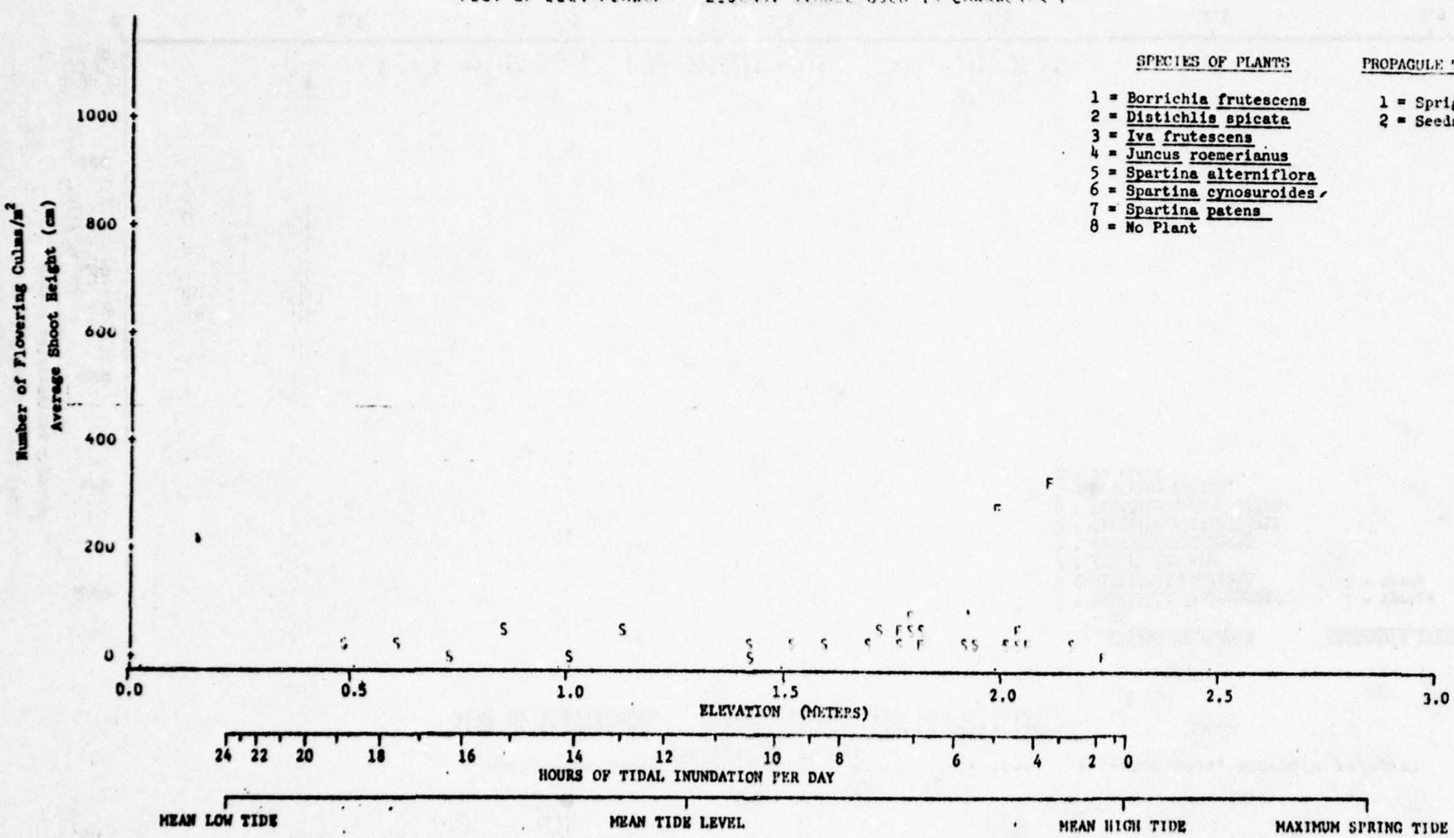
PLOT OF AER*ELEV SYMBOL USED IS A



Note: Maximum Spring Tide = 2.7 Metres

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   2:44 THURSDAY, DECEMBER 22, 1977   69
SPECIES=4   PROP=1

PLOT OF ELEV*SH_HT   LEGEND: SYMBOL USED IS CHARACTER S
PLOT OF ELEV*FLOWER   LEGEND: SYMBOL USED IS CHARACTER F



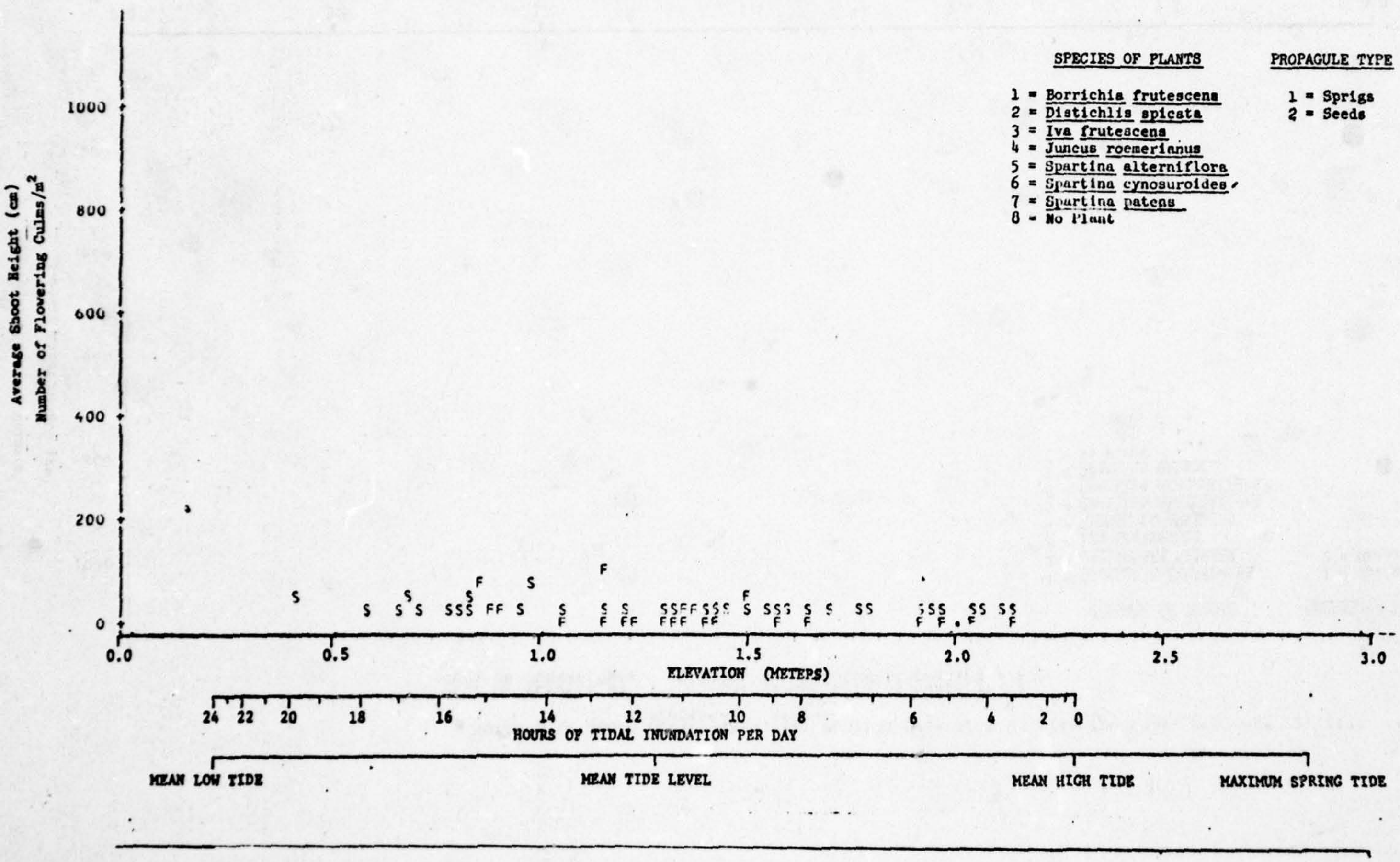
SPECIES OF PLANTS	PROPAGULE TYPE
1 = *Borrichia frutescens*	1 = Sprigs
2 = *Distichlis spicata*	2 = Seeds
3 = *Iva frutescens*	
4 = *Juncus roemerianus*	
5 = *Spartina alterniflora*	
6 = *Spartina cynosuroides*	
7 = *Spartina patens*	
8 = No Plant	

D175

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   2:44 THURSDAY, DECEMBER 22, 1977   71
SPECIES=5   PROP=1

PLOT OF ELEV*SH_HT   LEGEND: SYMBOL USED IS CHARACTER S
PLOT OF ELEV*FLOWER   LEGEND: SYMBOL USED IS CHARACTER F

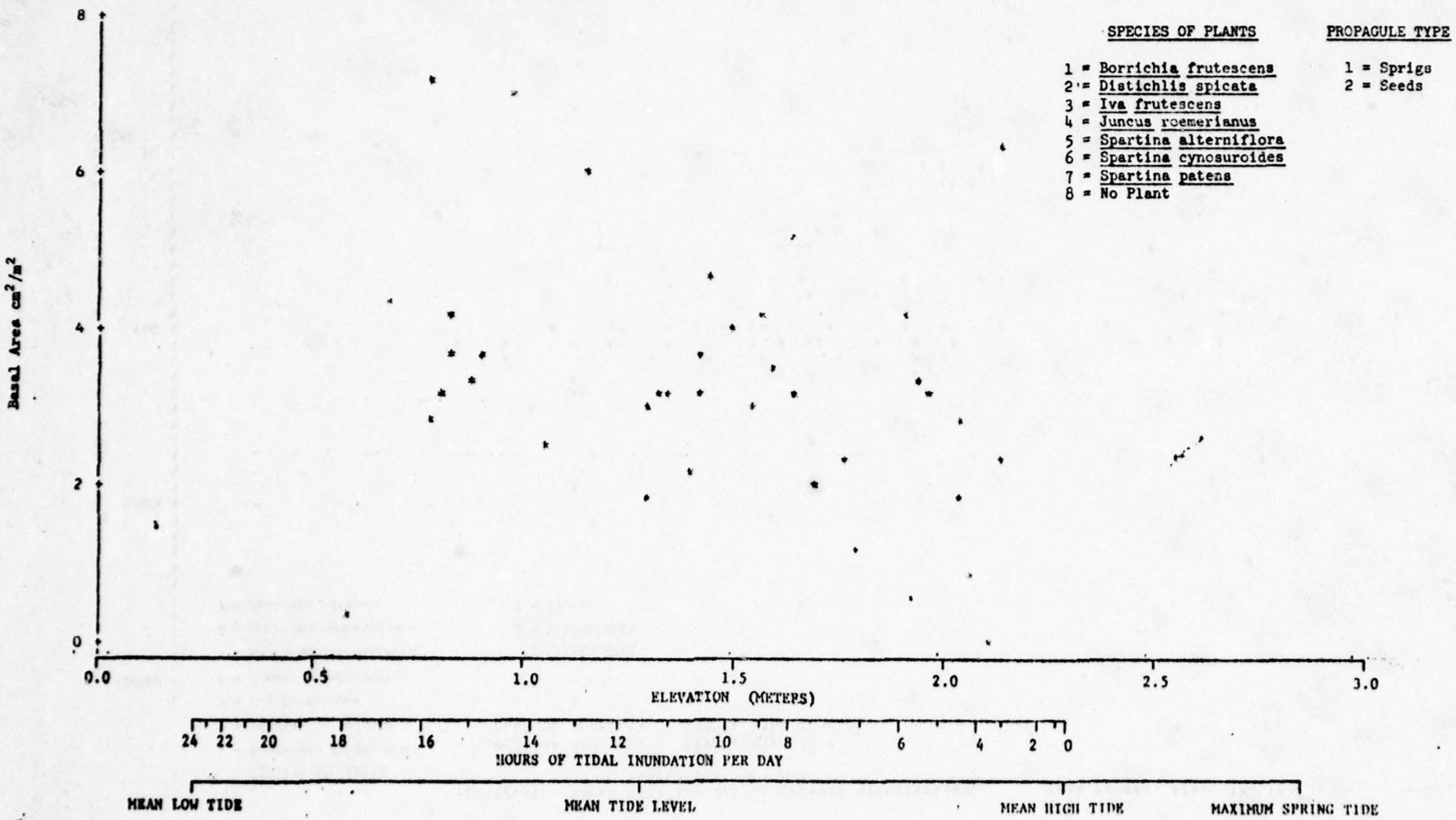
SPECIES OF PLANTS	PROPAGULE TYPE
1 = Borrichia frutescens	1 = Sprigs
2 = Distichlis spicata	2 = Seeds
3 = Iva frutescens	
4 = Juncus roemerianus	
5 = Spartina alterniflora	
6 = Spartina cynosuroides	
7 = Spartina patens	
8 = No Plant	



D176

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   2:44 THURSDAY, DECEMBER 22, 1977 119
SPECIES=5   PROP=1

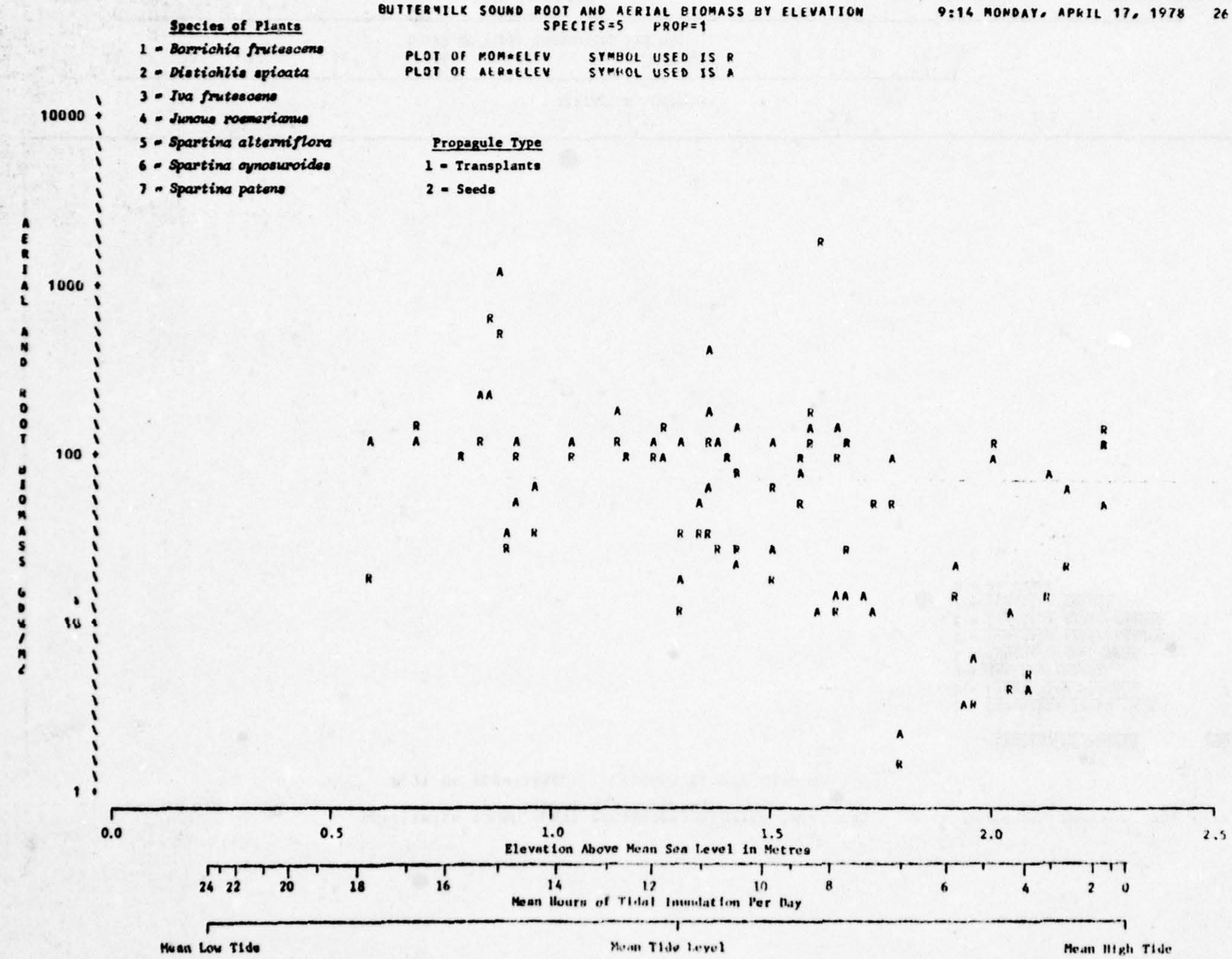
PLOT OF ELEV*BASAL   LEGEND: SYMBOL USED IS *



D177

BUTTERMILK SOUND ROOT AND AERIAL BIOMASS BY ELEVATION 9:14 MONDAY, APRIL 17, 1978 26
SPECIES=5 PROP=1

PLOT OF ROM*ELEV SYMBOL USED IS R
PLOT OF AER*ELEV SYMBOL USED IS A



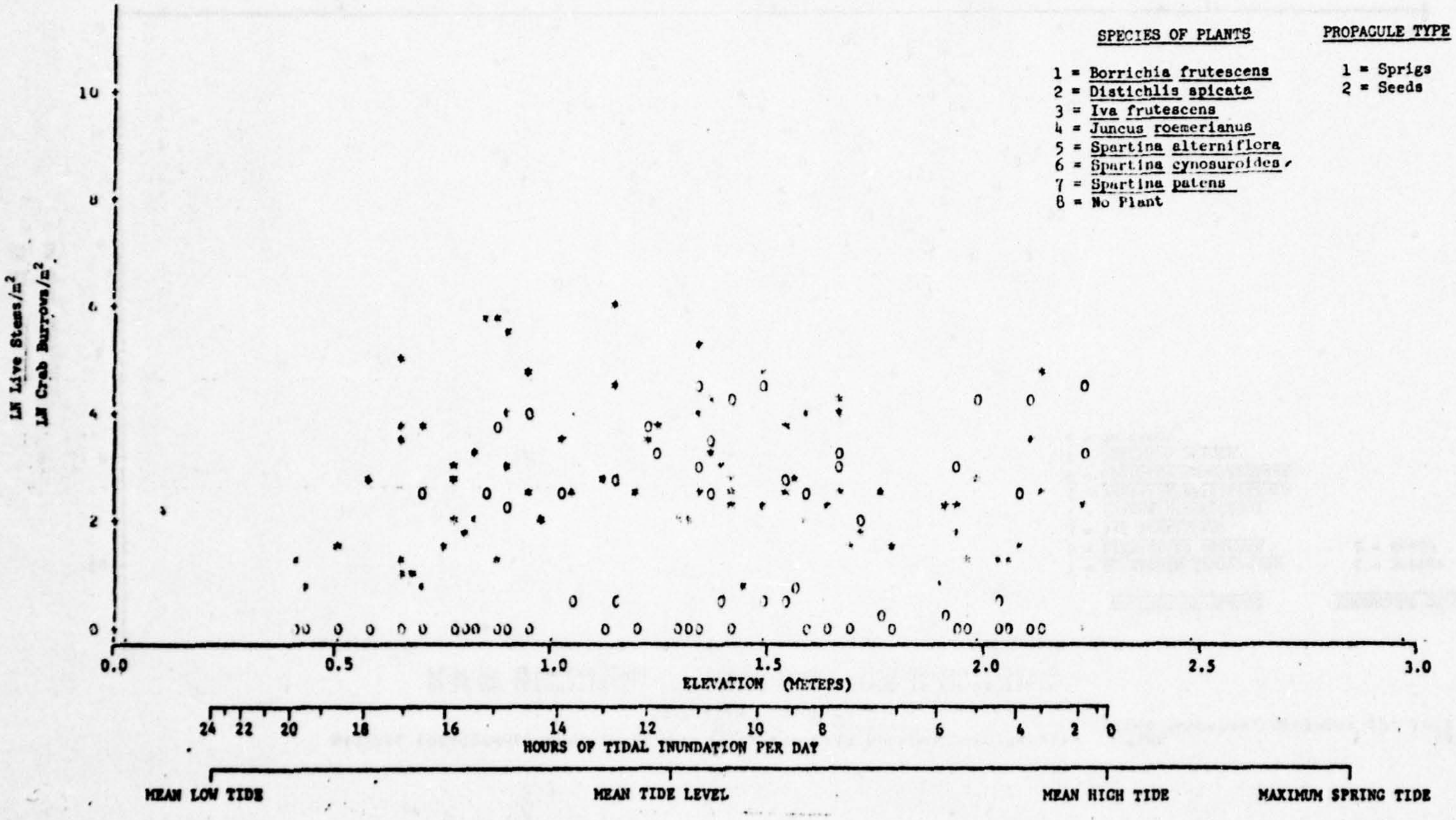
Note: Maximum Spring Tide = 2.7 Metres

D178

NATURAL LOGARITHMIC PLOT OF CULM DENSITY AND CRAB BURROWS DENSITY WITH   TIME
2:44 THURSDAY, DECEMBER 22, 1977

SPECIES=5   PROP=1

PLOT OF ELEV*STEM_C   LEGEND: SYMBOL USED IS CHARACTER *
PLOT OF ELEV*CRAB_BUR   LEGEND: SYMBOL USED IS CHARACTER 0

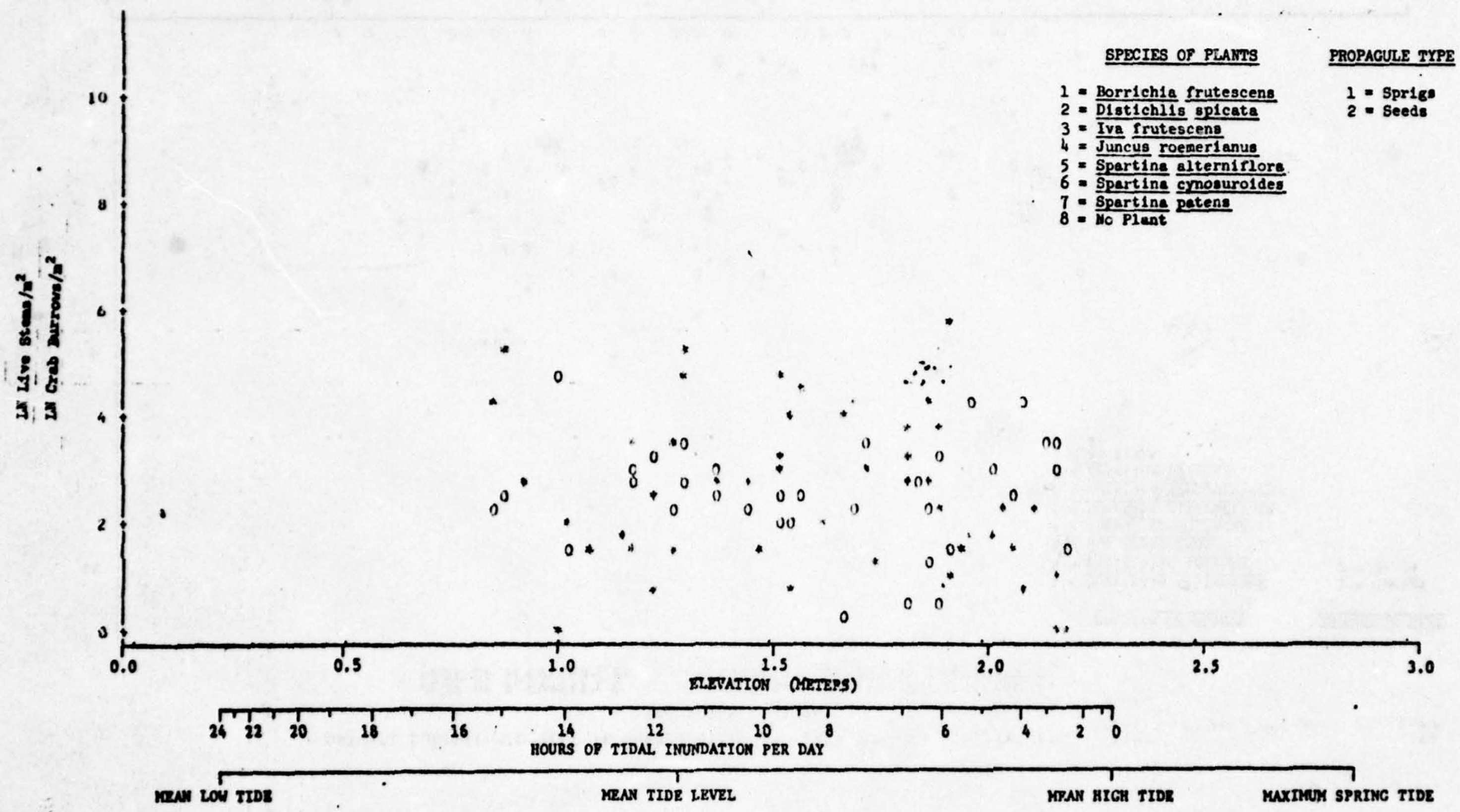


D179

NATURAL LOGARITHMIC PLOT IF CULM DENSITY AND CRAB BURROWS DENSITY WITH TIME 2:44 THURSDAY, DECEMBER 22, 1977 40

SPECIES=5 PROP=2

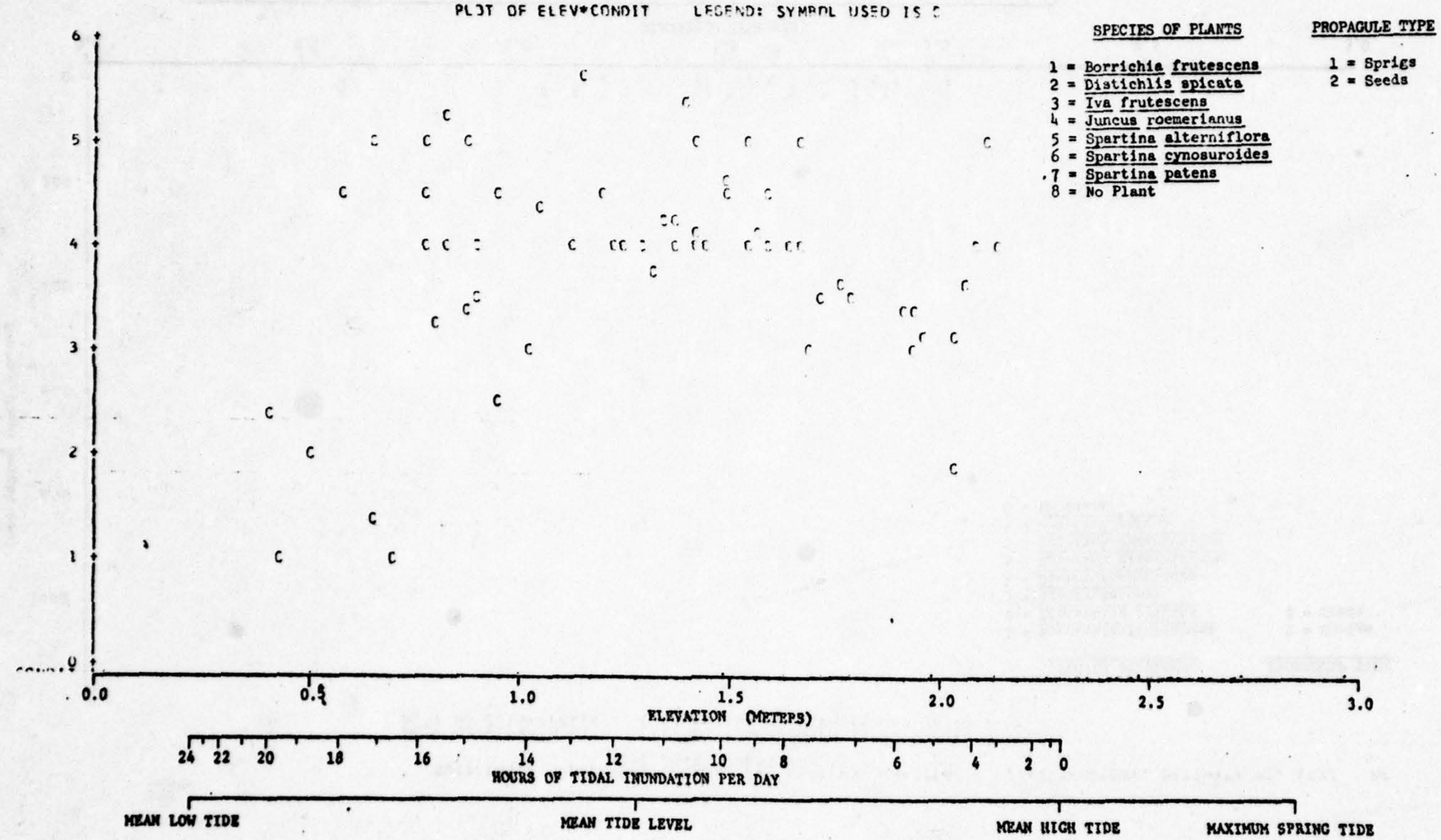
PLOT OF ELEV*STEM_D LEGEND: SYMBOL USED IS CHARACTER *
PLOT OF ELEV*CRAB_BUR LEGEND: SYMBOL USED IS CHARACTER 0



D180

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   2:44 THURSDAY, DECEMBER 22, 1977   55
SPECIES=5   PROP=1

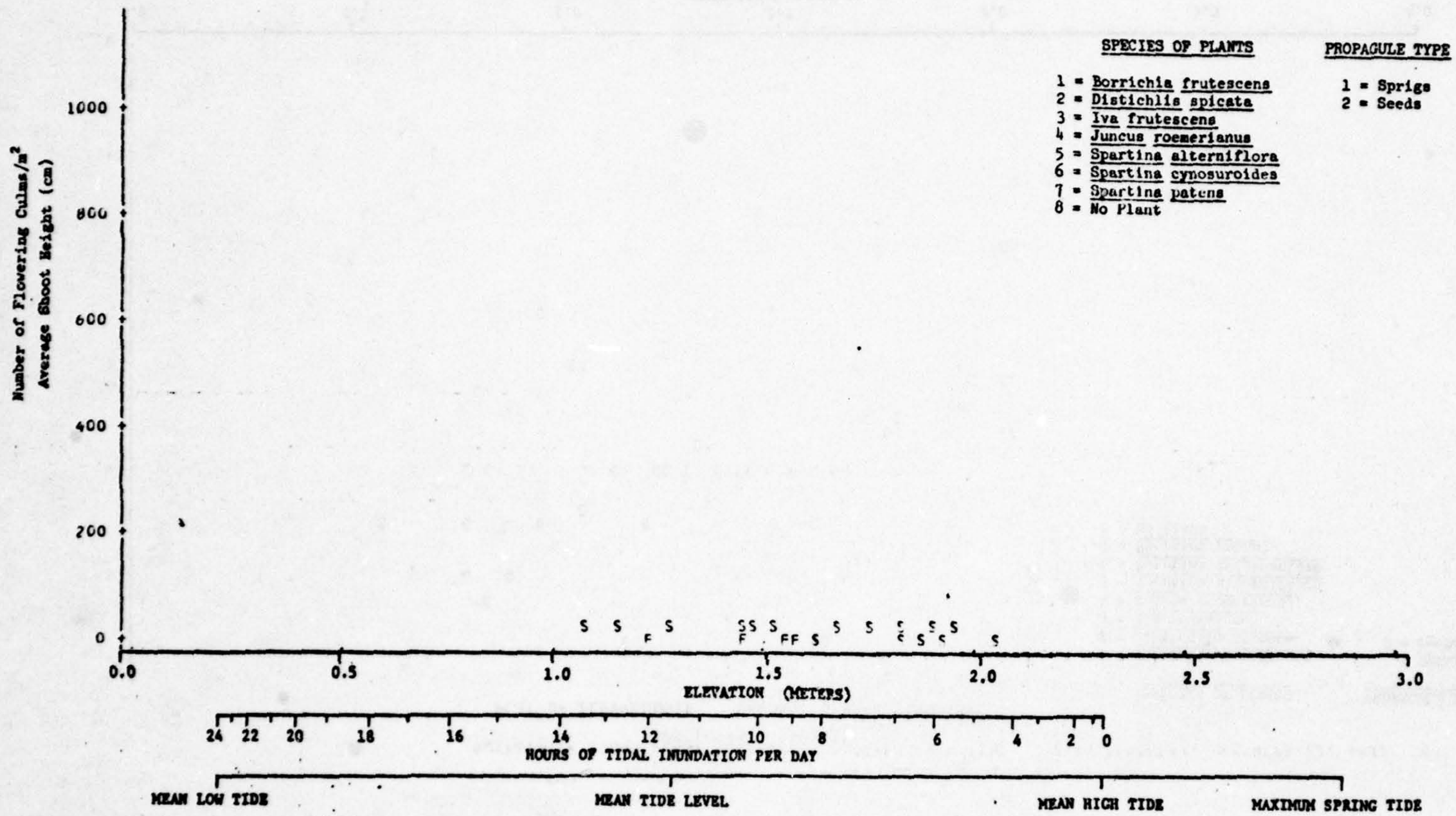
PLOT OF ELEV*CONDIT   LEGEND: SYMBOL USED IS C



D181

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   2:44 THURSDAY, DECEMBER 22, 1977   72
SPECIES=5   PROP=2

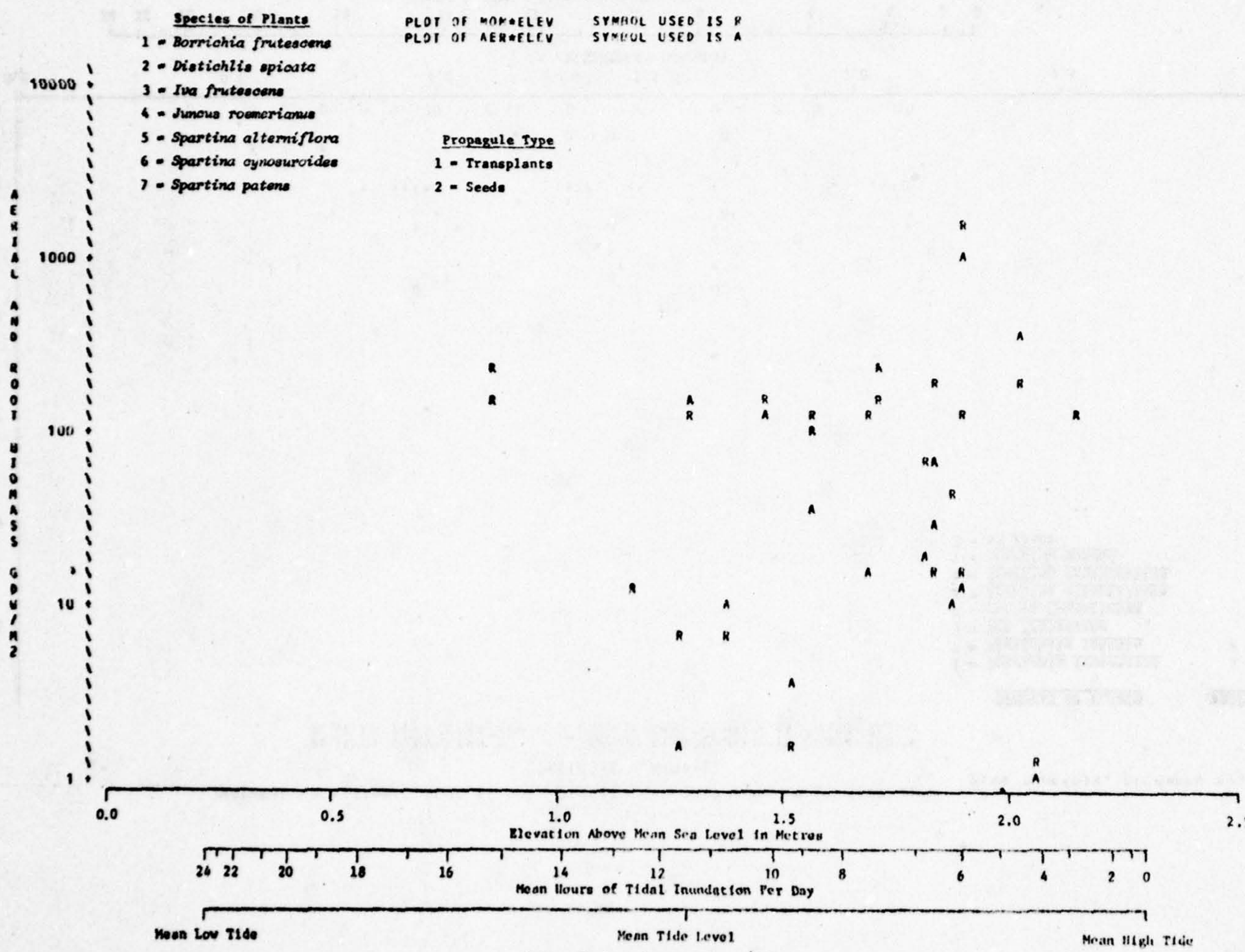
PLOT OF ELEV*SH_HT   LEGEND: SYMBOL USED IS CHARACTER S
PLOT OF ELEV*FLOWER   LEGEND: SYMBOL USED IS CHARACTER F



D182

BUTTERMILK SOUND ROOT AND AERIAL BIOMASS BY ELEVATION   9:14 MONDAY, APRIL 17, 1978   27

SPECIES=5   PROP=2



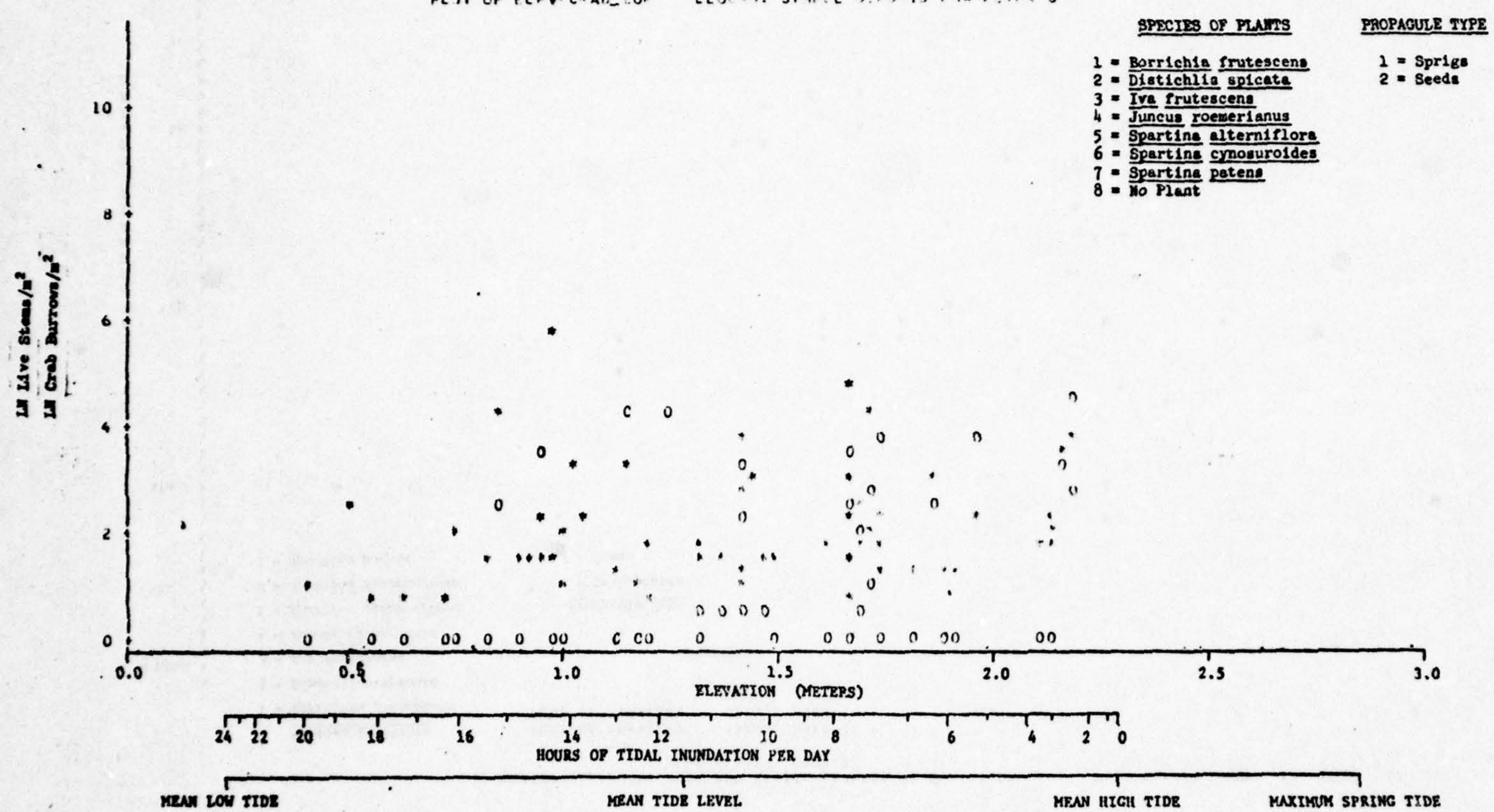
Note: Maximum Spring Tide = 2.7 Metres

D183

NATURAL LOGARITHMIC PLOT IF CULM DENSITY AND CRAB BURROWS DENSITY WITH TIME 42
2:44 THURSDAY, DECEMBER 22, 1977

SPECIES=6 PROP=1

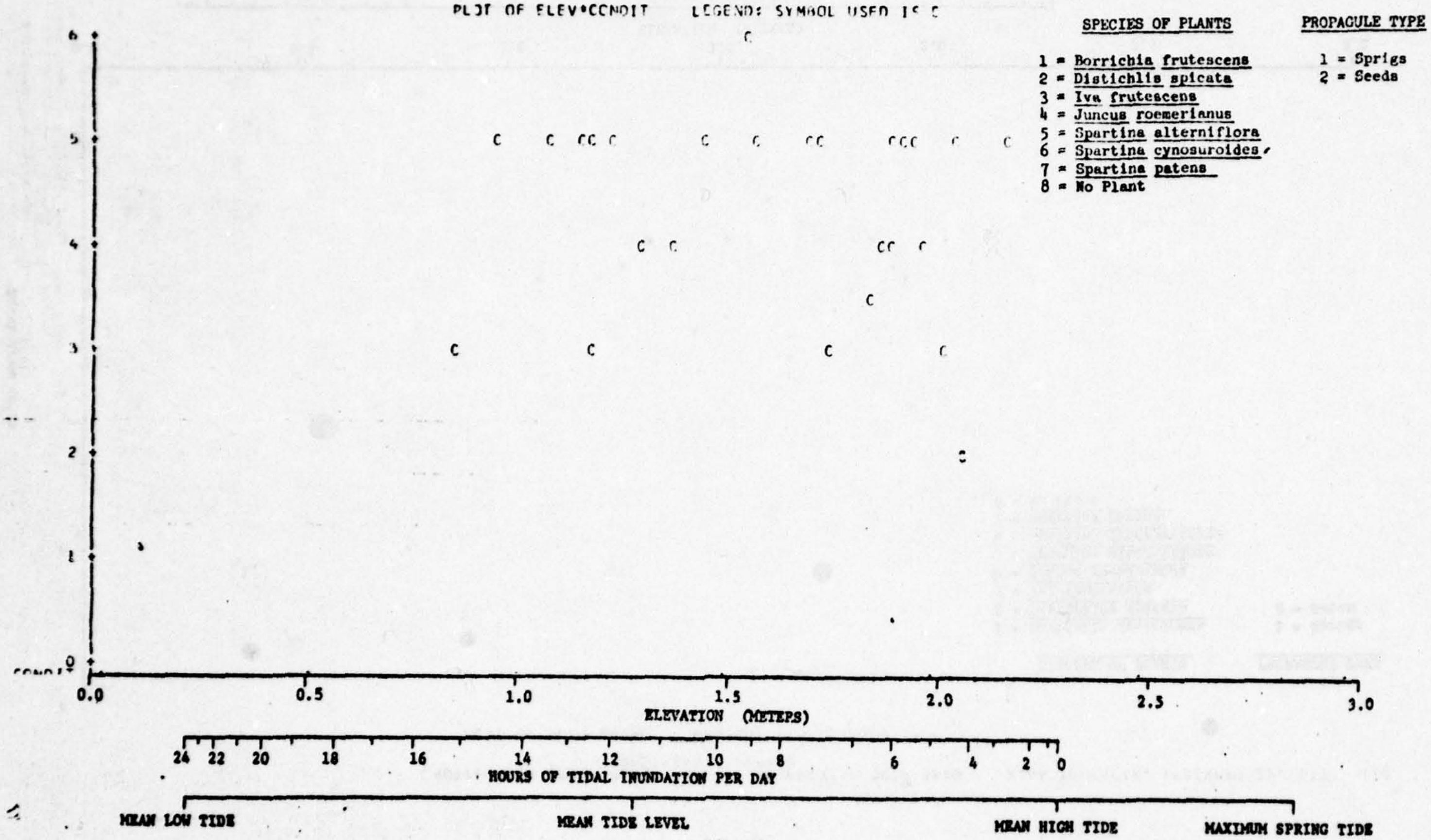
PLOT OF ELEV*STEM_C LEGEND: SYMBOL USED IS CHARACTER *
PLOT OF ELEV*CRAB_BUR LEGEND: SYMBOL USED IS CHARACTER 0



D184

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   2:44 THURSDAY, DECEMBER 22, 1977   56
SPECIES=5   PROP=2

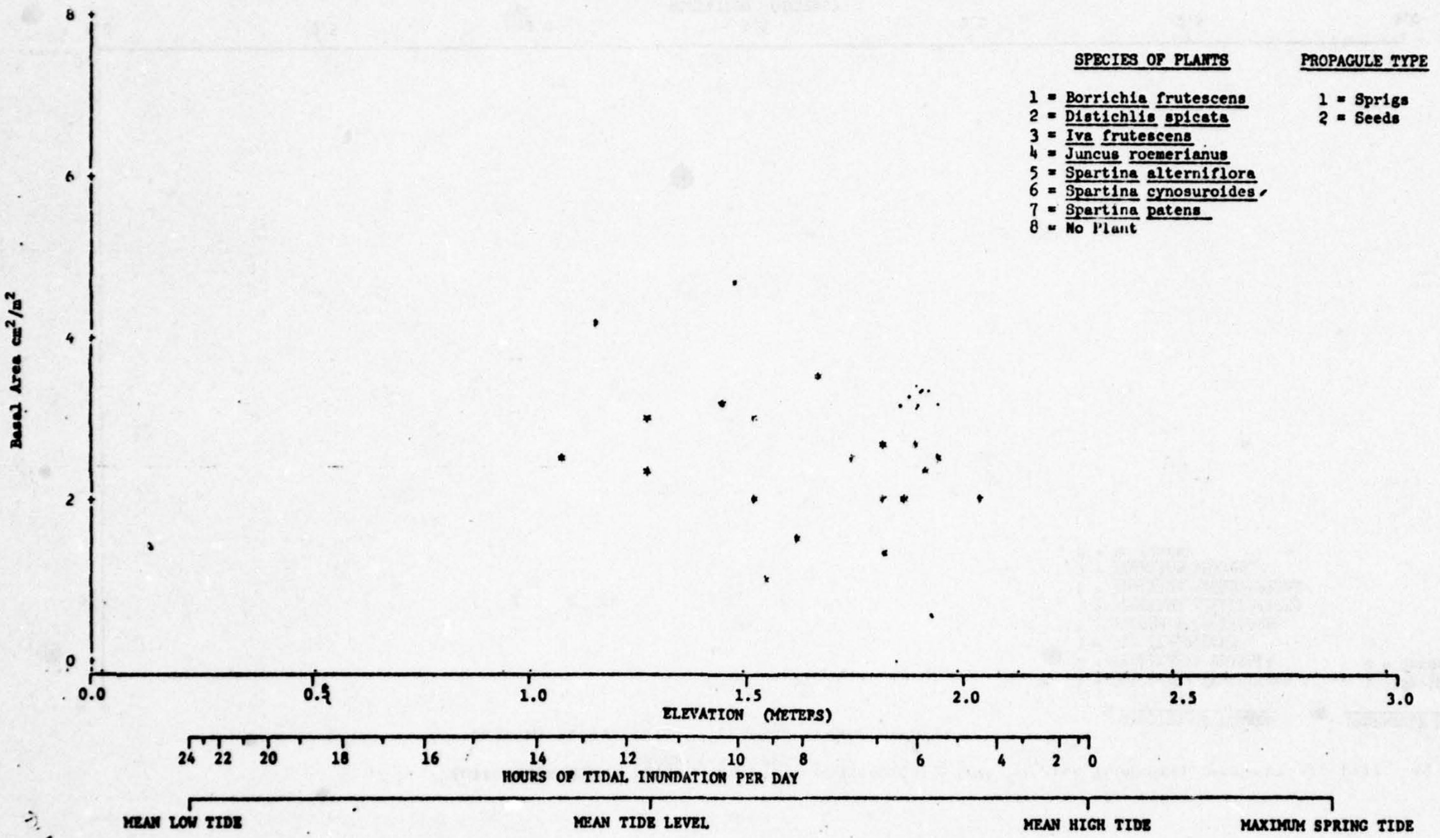
PLOT OF ELEV*CONDIT   LEGEND: SYMBOL USED IS C



D185

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   2:44 THURSDAY, DECEMBER 22, 1977 120
SPECIES=5 PROP=2

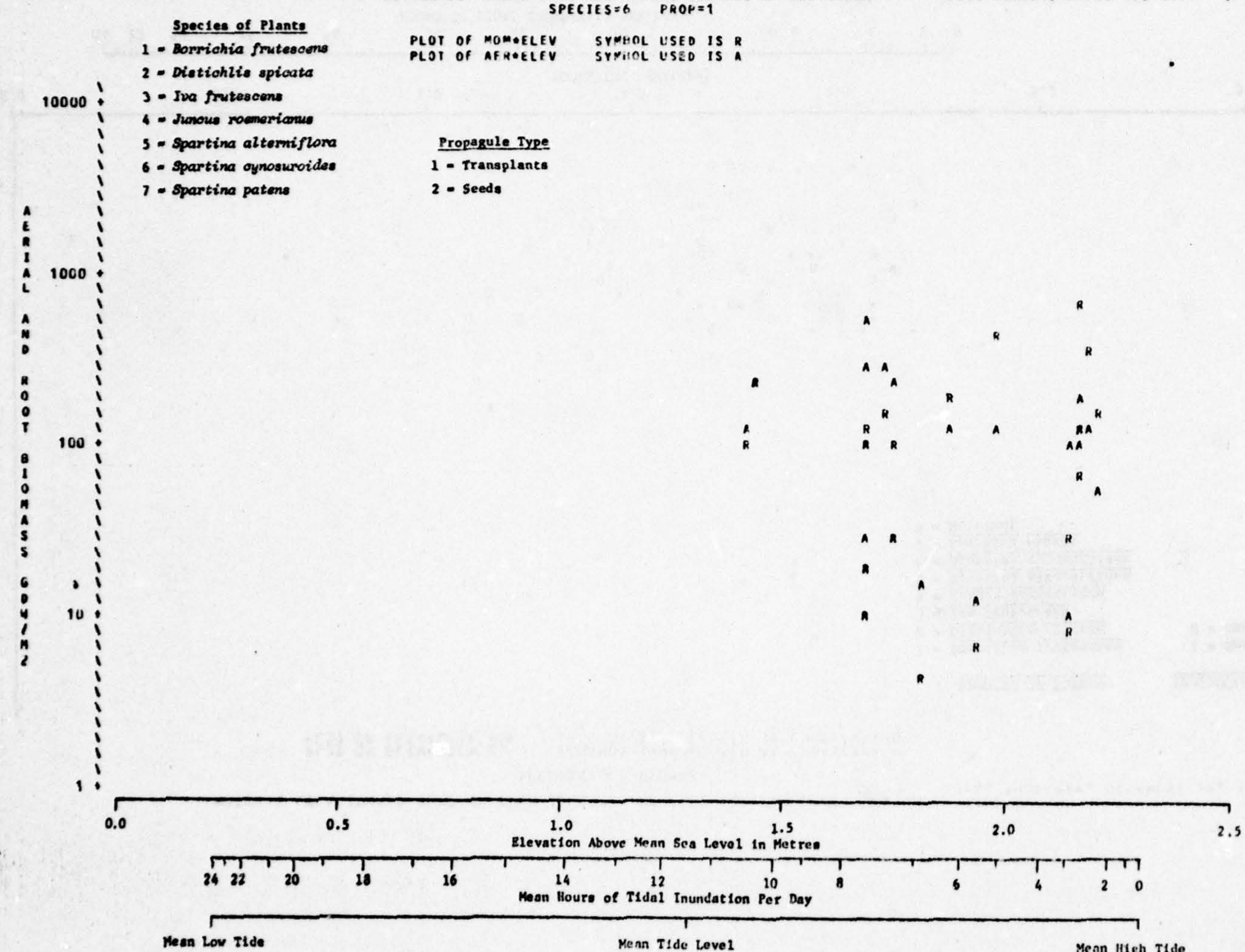
PLOT OF ELEV*BASAL   LEGEND: SYMBOL USED IS *



D186

BUTTERMILK SOUND ROOT AND AERIAL BIOMASS BY ELEVATION 9:14 MONDAY, APRIL 17, 1978 2?
SPECIES=6 PROP=1

PLOT OF MOM*ELEV SYMBOL USED IS R
PLOT OF AEM*ELEV SYMBOL USED IS A



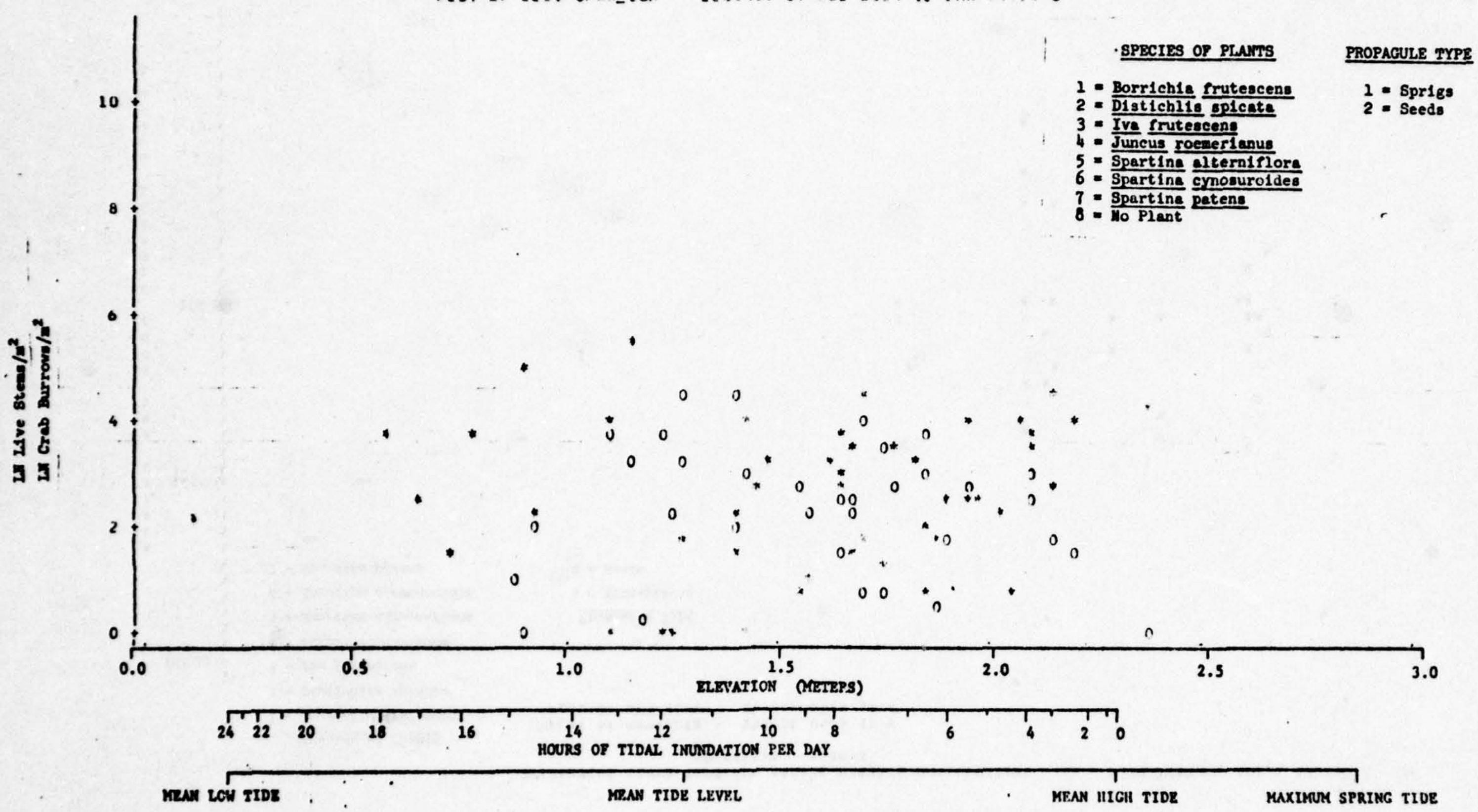
Note: Maximum Spring Tide = 2.7 Metres

D187

NATURAL LOGARITHMIC PLOT IF CULM DENSITY AND CRAB BURROWS DENSITY WITH TIME 2:44 THURSDAY, DECEMBER 22, 1977 43

SPECIES=6 PROP=2

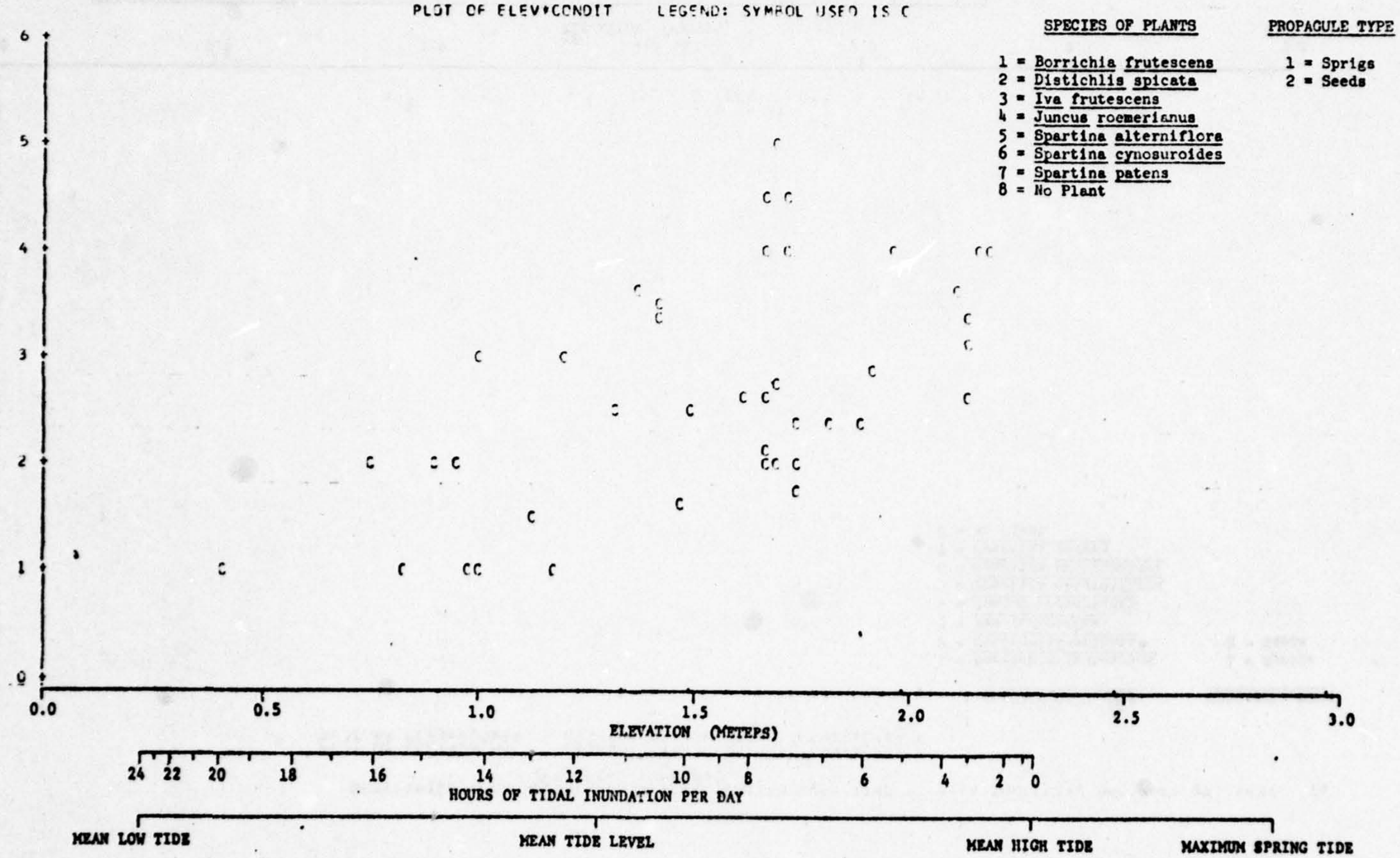
PLOT OF ELEV*STEM_C LEGEND: SYMBOL USED IS CHARACTER *
PLOT OF ELEV*CRAB_BUR LEGEND: SYMBOL USED IS CHARACTER O



D188

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   2:44 THURSDAY, DECEMBER 22, 1977   58
SPECIES=6   PROP=1

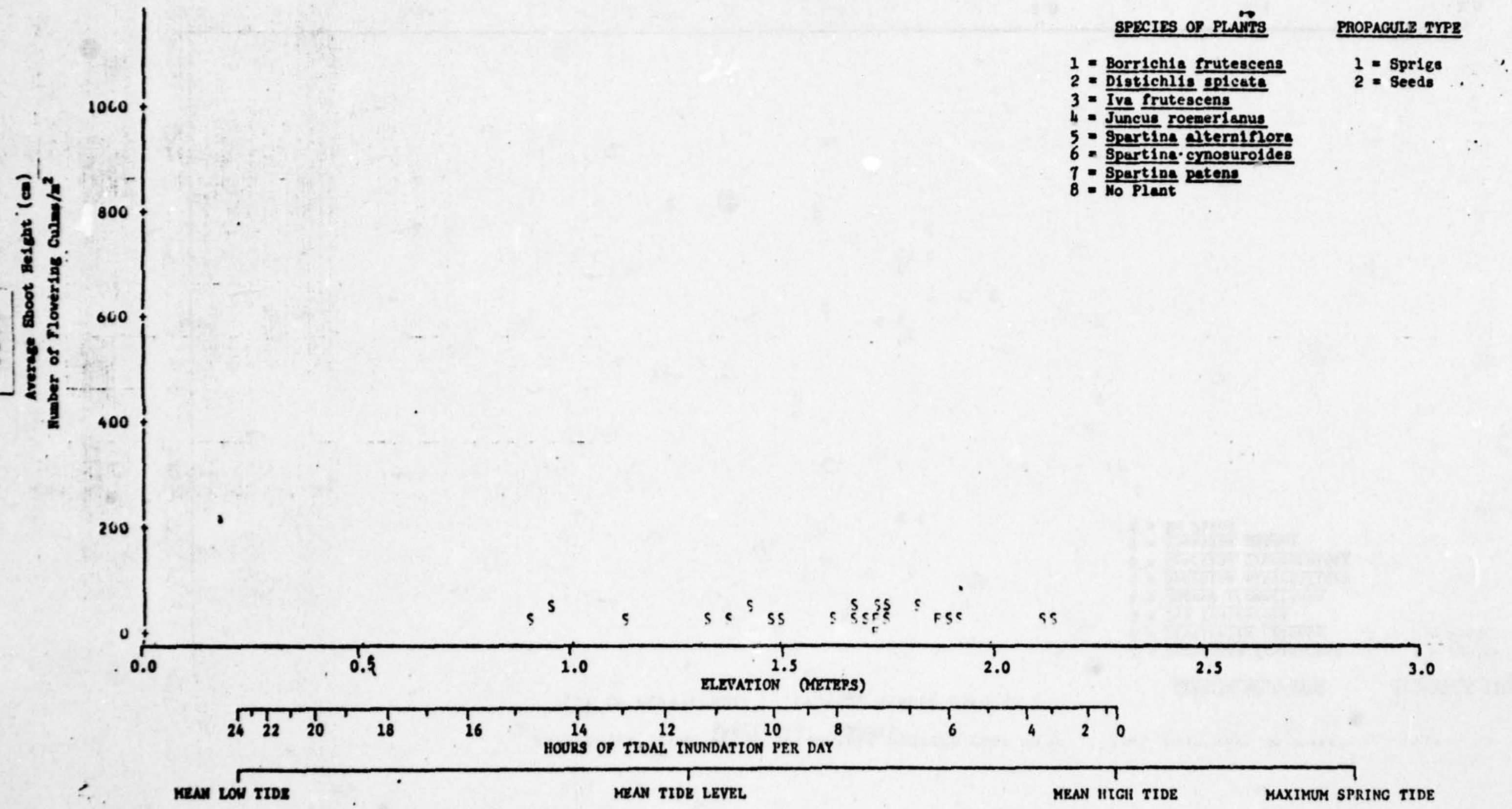
PLOT OF ELEV*CONDIT   LEGEND: SYMBOL USED IS C



D189

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME SPECIES=6 PROP=1 2:44 THURSDAY, DECEMBER 22, 1977 74

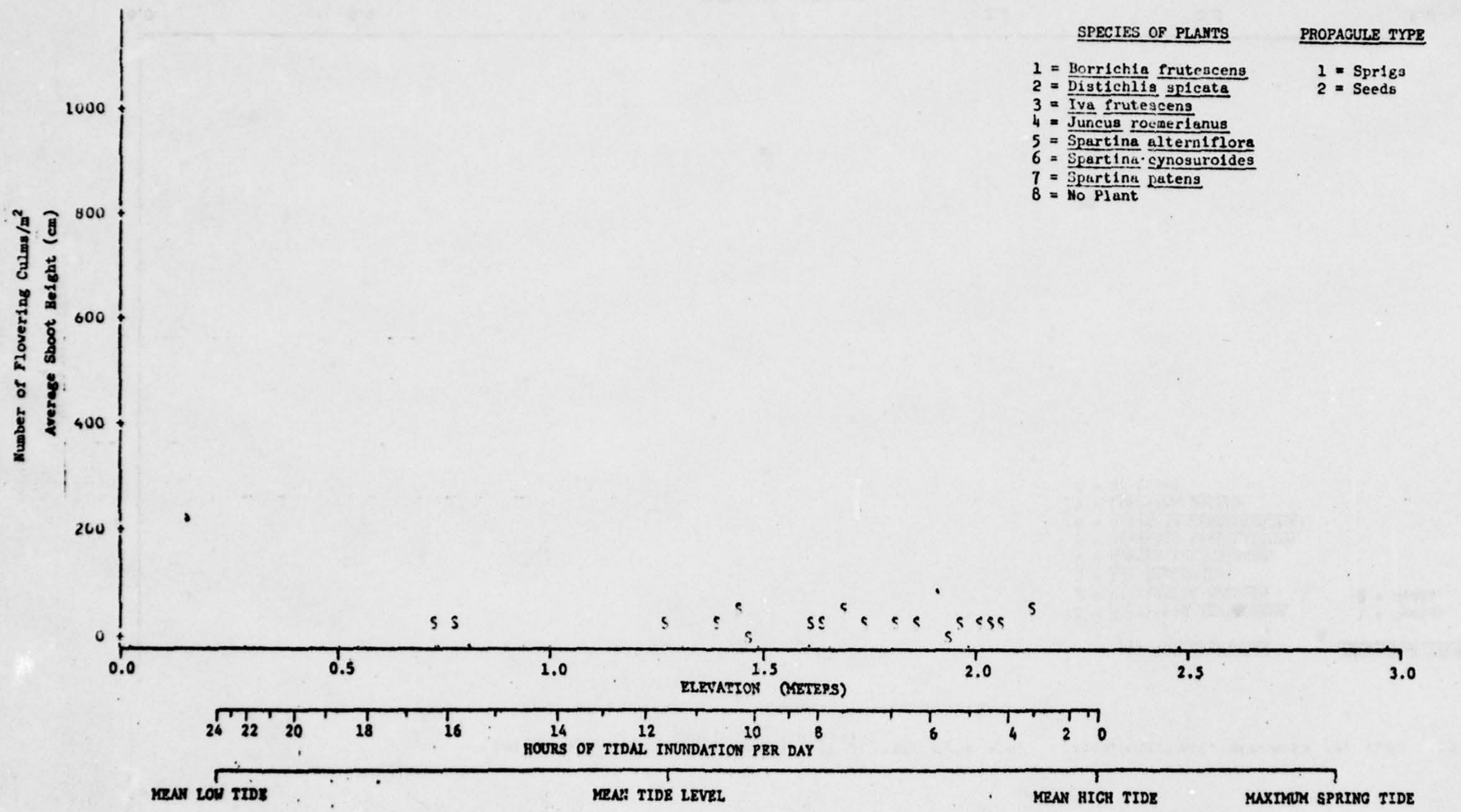
PLOT OF ELEV*SH_HT LEGEND: SYMBOL USED IS CHARACTER S
PLOT OF ELEV*FLOWER LEGEND: SYMBOL USED IS CHARACTER F



D190

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   2:44 THURSDAY, DECEMBER 22, 1977   75
SPECIES=6   PROP=2

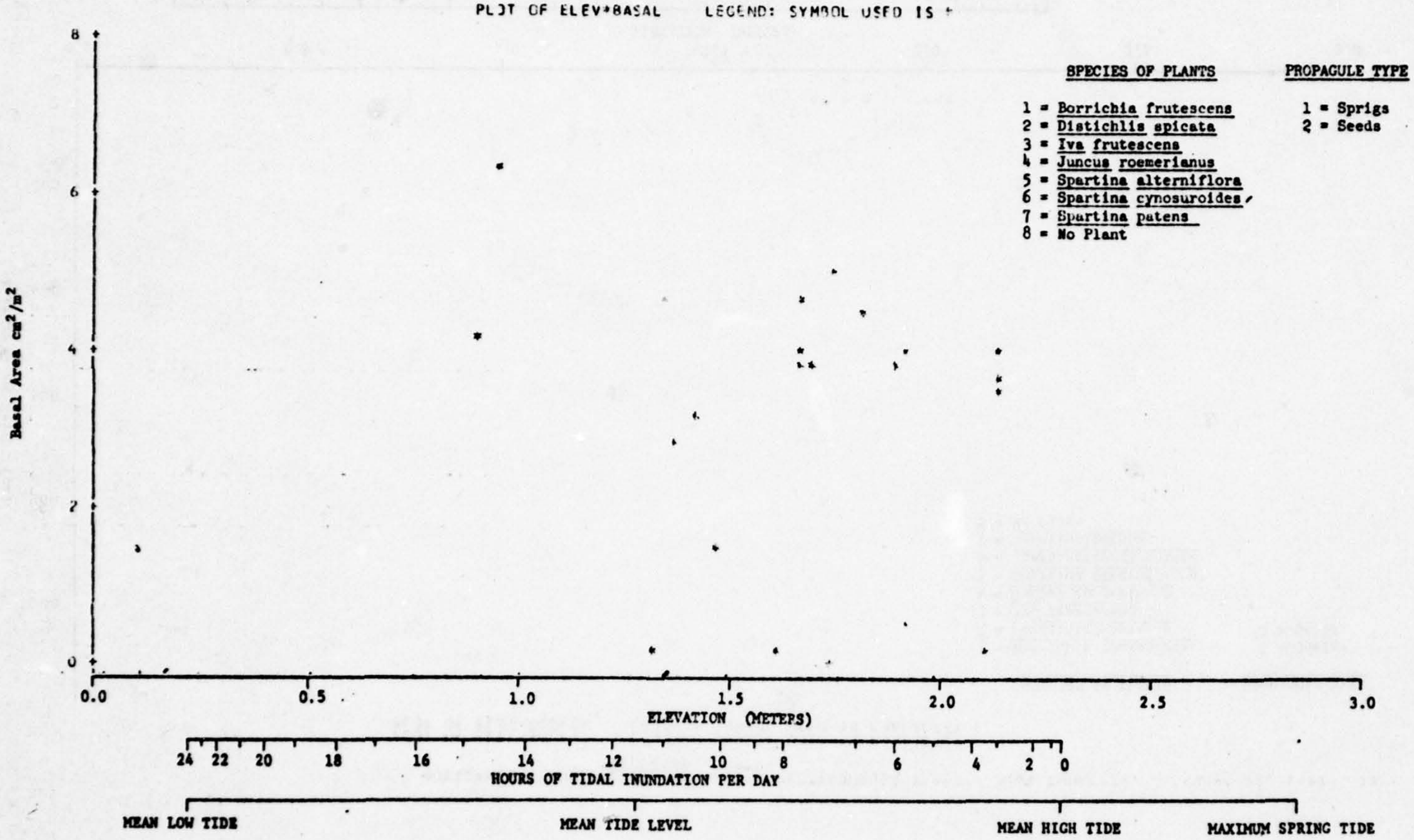
PLOT OF ELEV*SH_HT   LEGEND: SYMBOL USED IS CHARACTER S
PLOT OF ELEV*FLOWER   LEGEND: SYMBOL USED IS CHARACTER F



D191

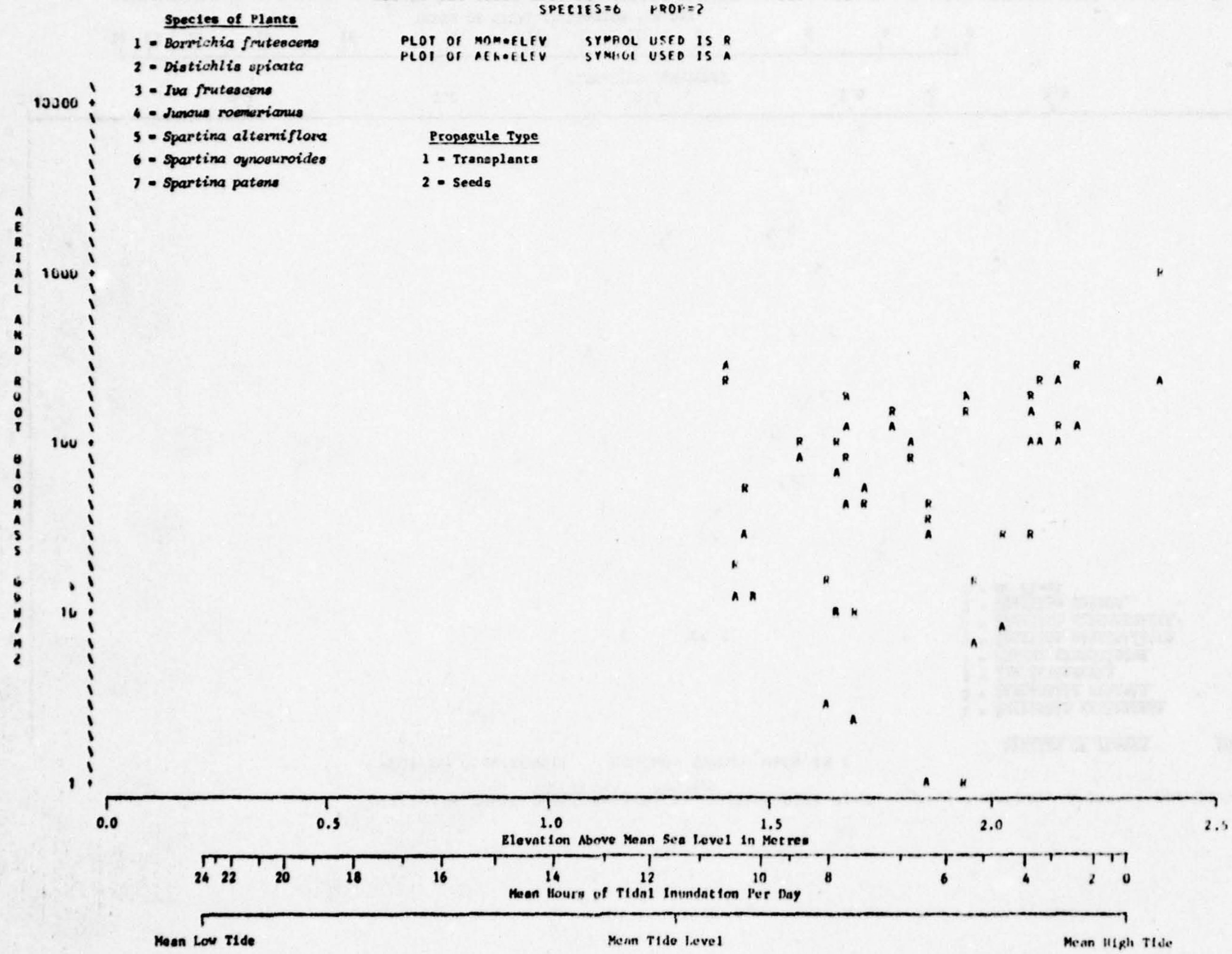
BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 2:44 THURSDAY, DECEMBER 22, 1977 132
SPECIES=6 PROP=1

PLOT OF ELEV*BASAL LEGEND: SYMBOL USED IS +



D192

BUTTERMILK SOUND ROOT AND AERIAL BIOMASS BY ELEVATION 9:14 MONDAY, APRIL 17, 1978 29
SPECIES=6 PROP=2

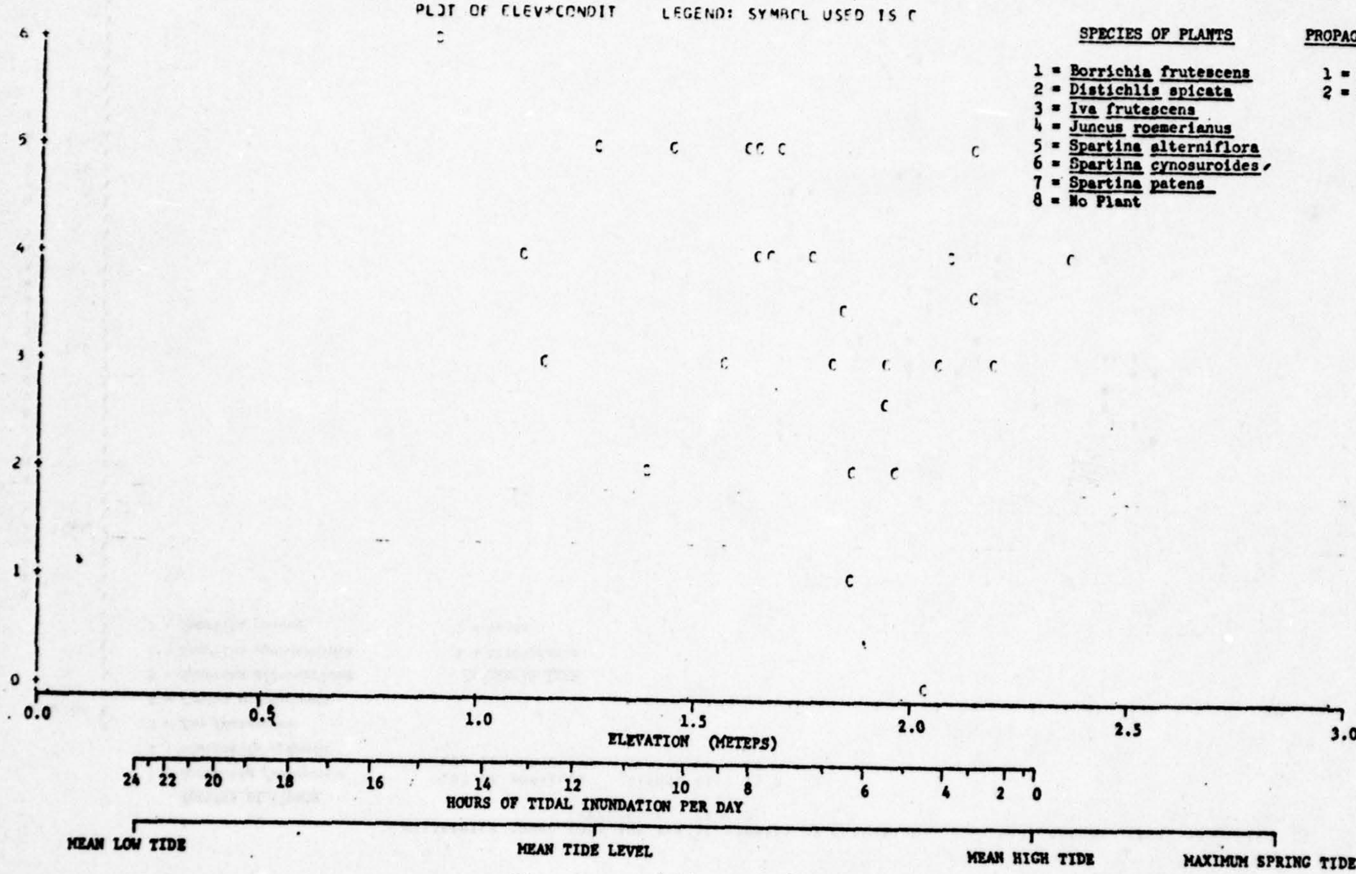


Note: Maximum Spring Tide = 2.7 Metres

D193

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   2:44 THURSDAY, DECEMBER 22, 1977   59
SPECIES=6   PROP=2

PLOT OF ELEV*CONDIT   LEGEND: SYMBOL USED IS C



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

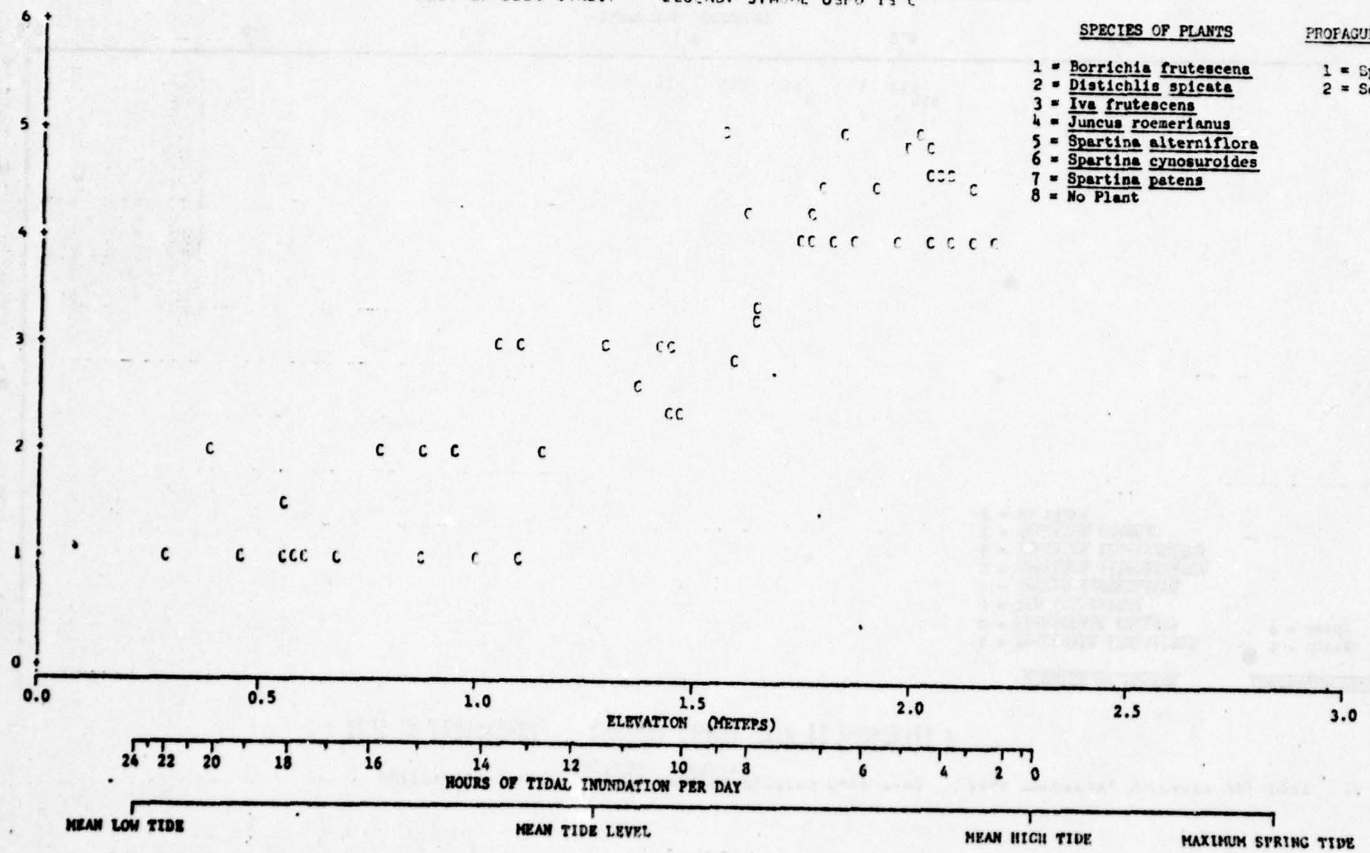
PROPAGULE TYPE

1 = Sprigs
2 = Seeds

D194

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 2:44 THURSDAY, DECEMBER 22, 1977 60
SPECIES=7 PROP=1

PLOT OF ELEV*CONDIT LEGEND: SYMBOL USED IS C



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

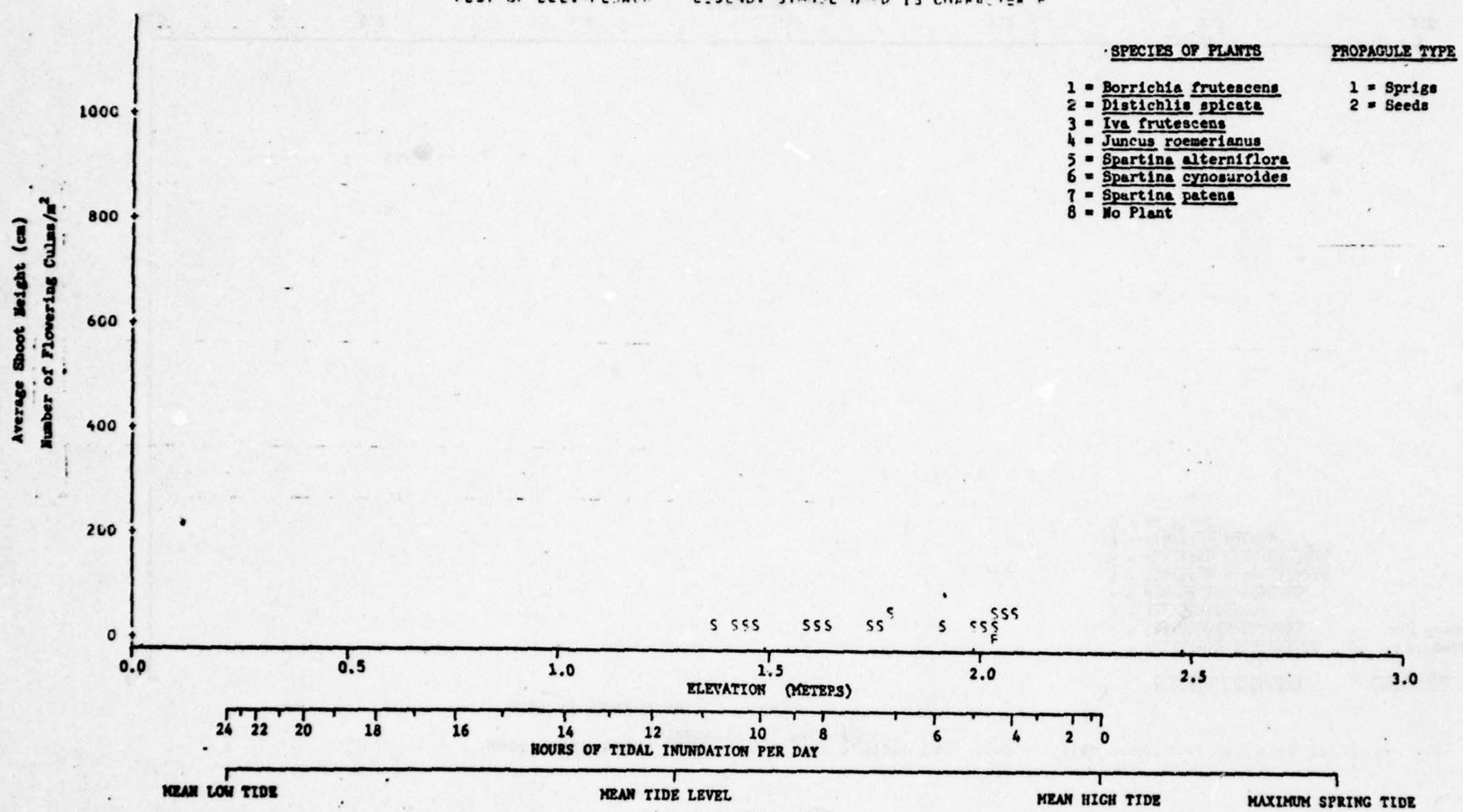
PROPAGULE TYPE

1 = Sprigs
2 = Seeds

D195

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   2:44 THURSDAY, DECEMBER 22, 1977   76
SPECIES=7   PROP=1

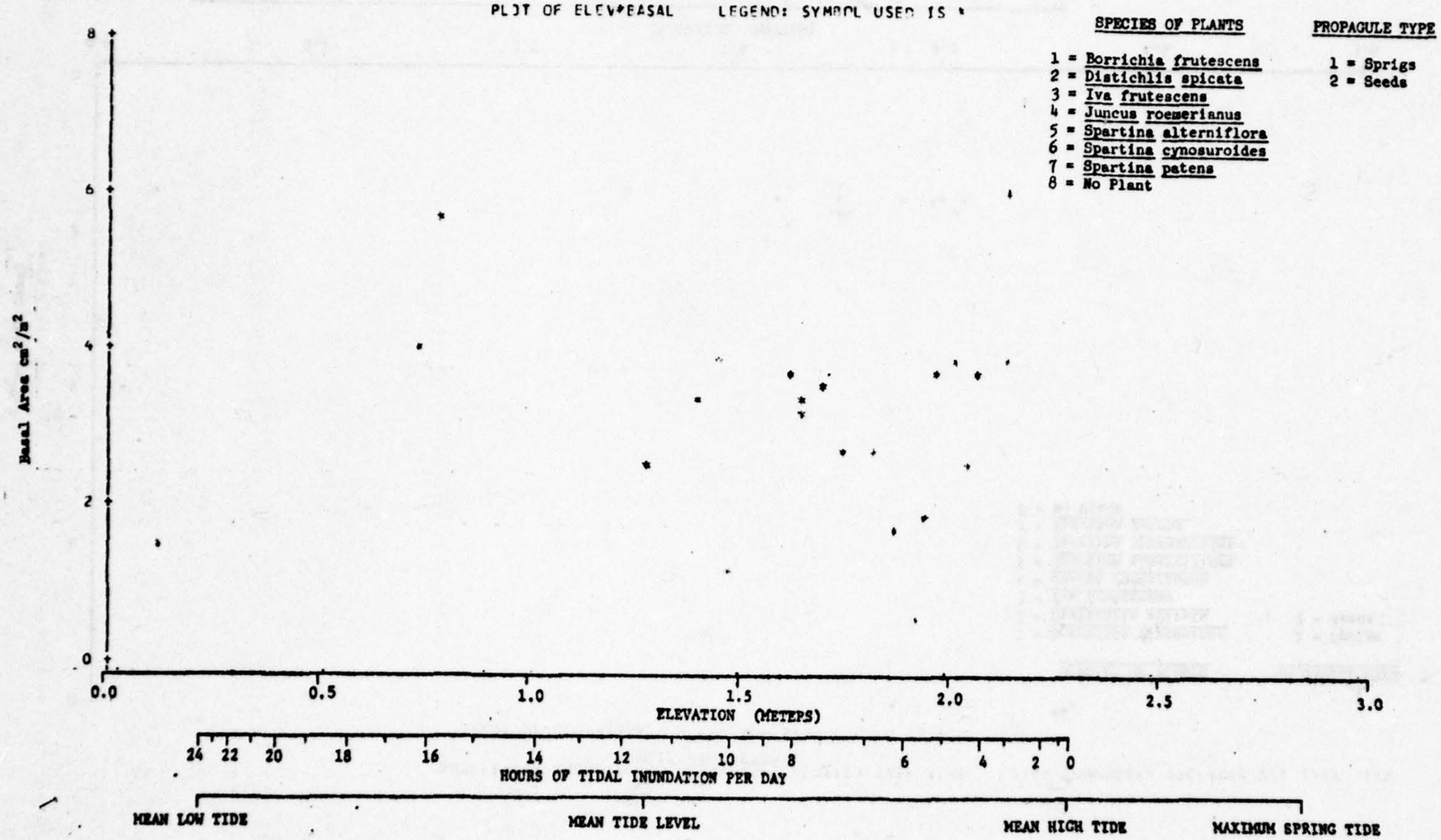
PLOT OF ELEV*SH_HT   LEGEND: SYMBOL USED IS CHARACTER S
PLOT OF ELEV*FLOWER   LEGEND: SYMBOL USED IS CHARACTER F



D196

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   2:44 THURSDAY, DECEMBER 22, 1977 123
SPECIES=6   PROP=2

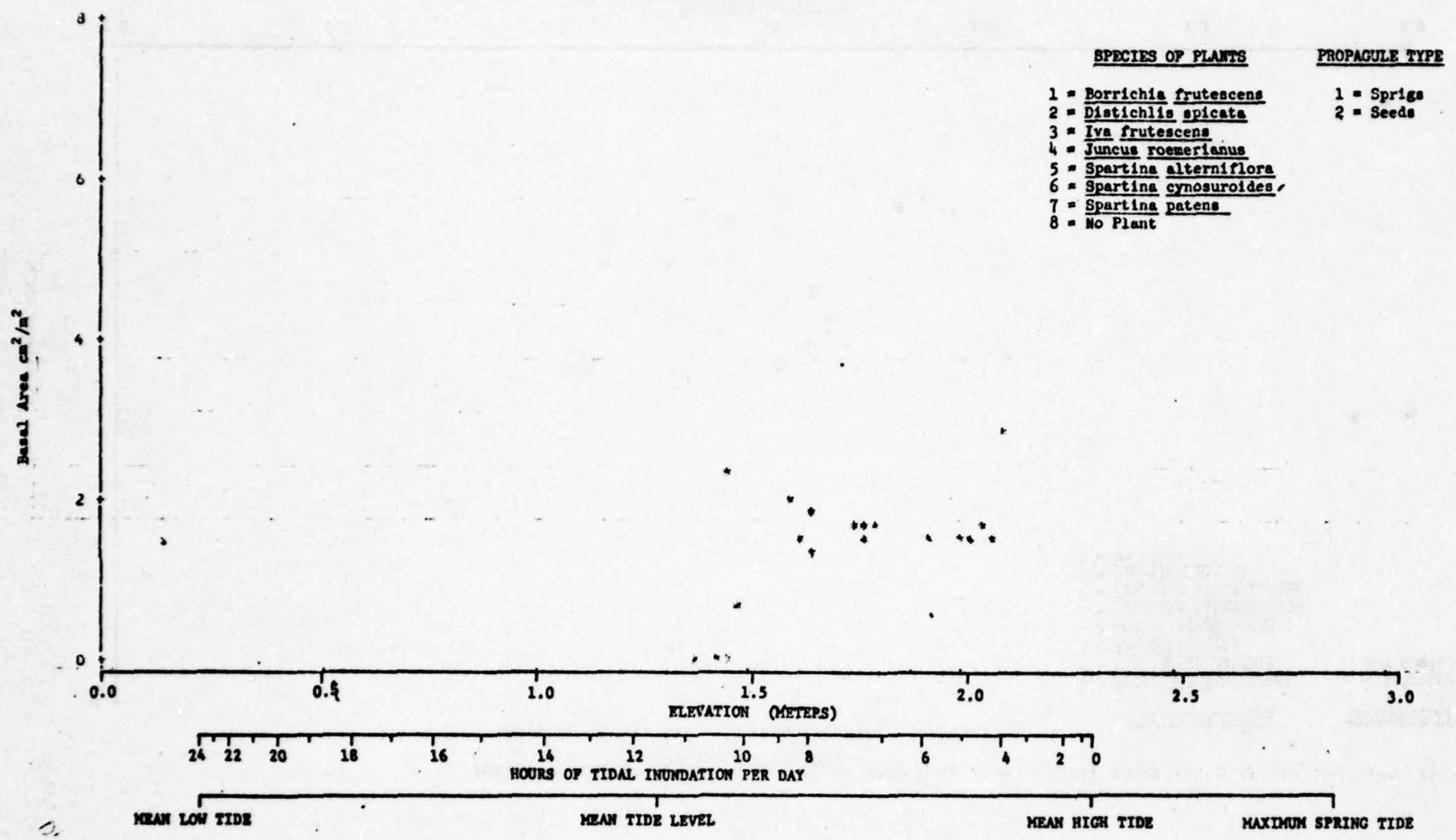
PLOT OF ELEV*BASAL   LEGEND: SYMBOL USED IS *



D197

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   2:44 THURSDAY, DECEMBER 22, 1977 124
SPECIES=7 PROP=1

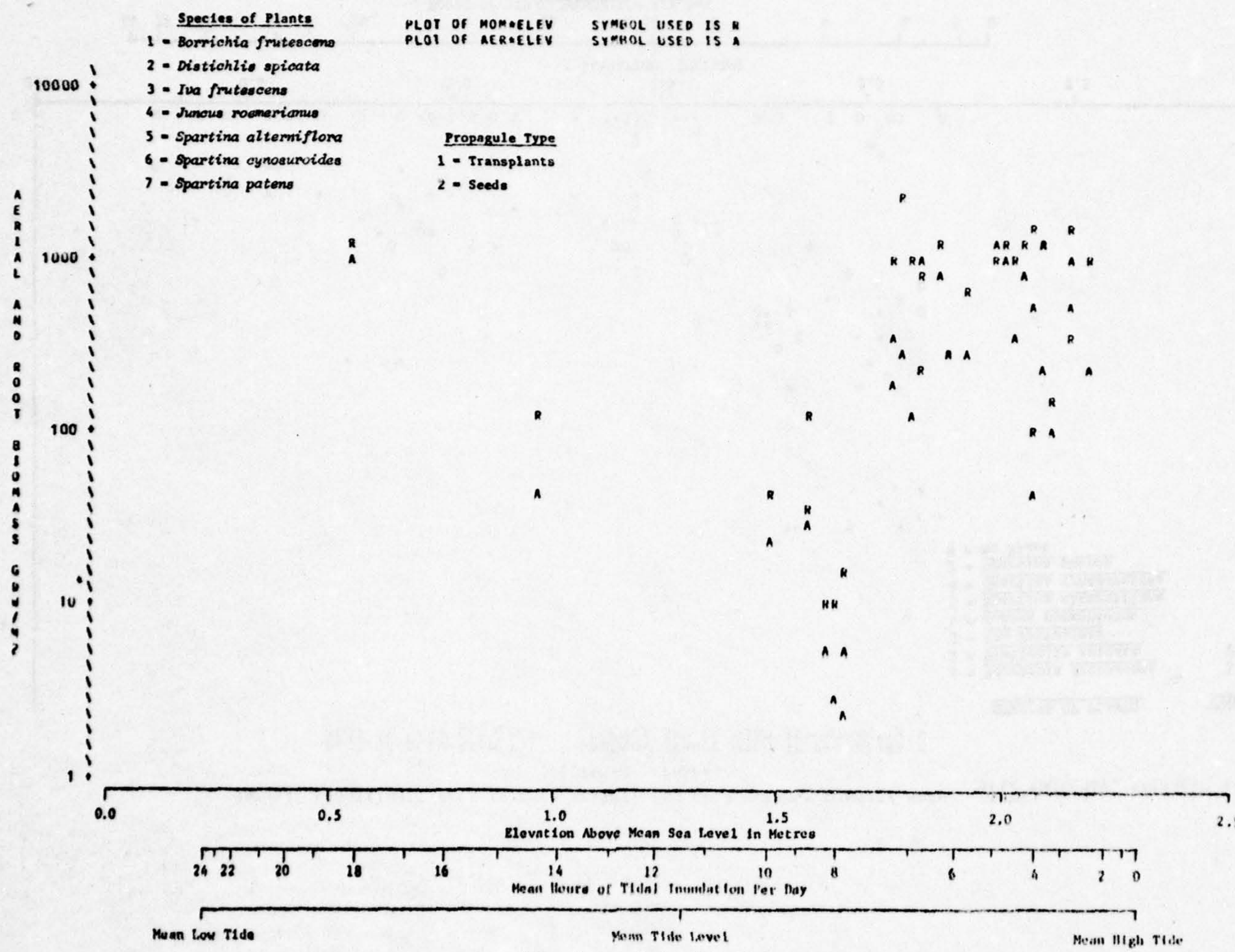
PLOT OF ELEV*BASA.   LEGEND: SYMBOL USED IS *



D198

BUTTERMILK SOUND ROOT AND AERIAL BIOMASS BY ELEVATION 9:14 MONDAY, APRIL 17, 1978 30

SPECIES=7 PROP=1



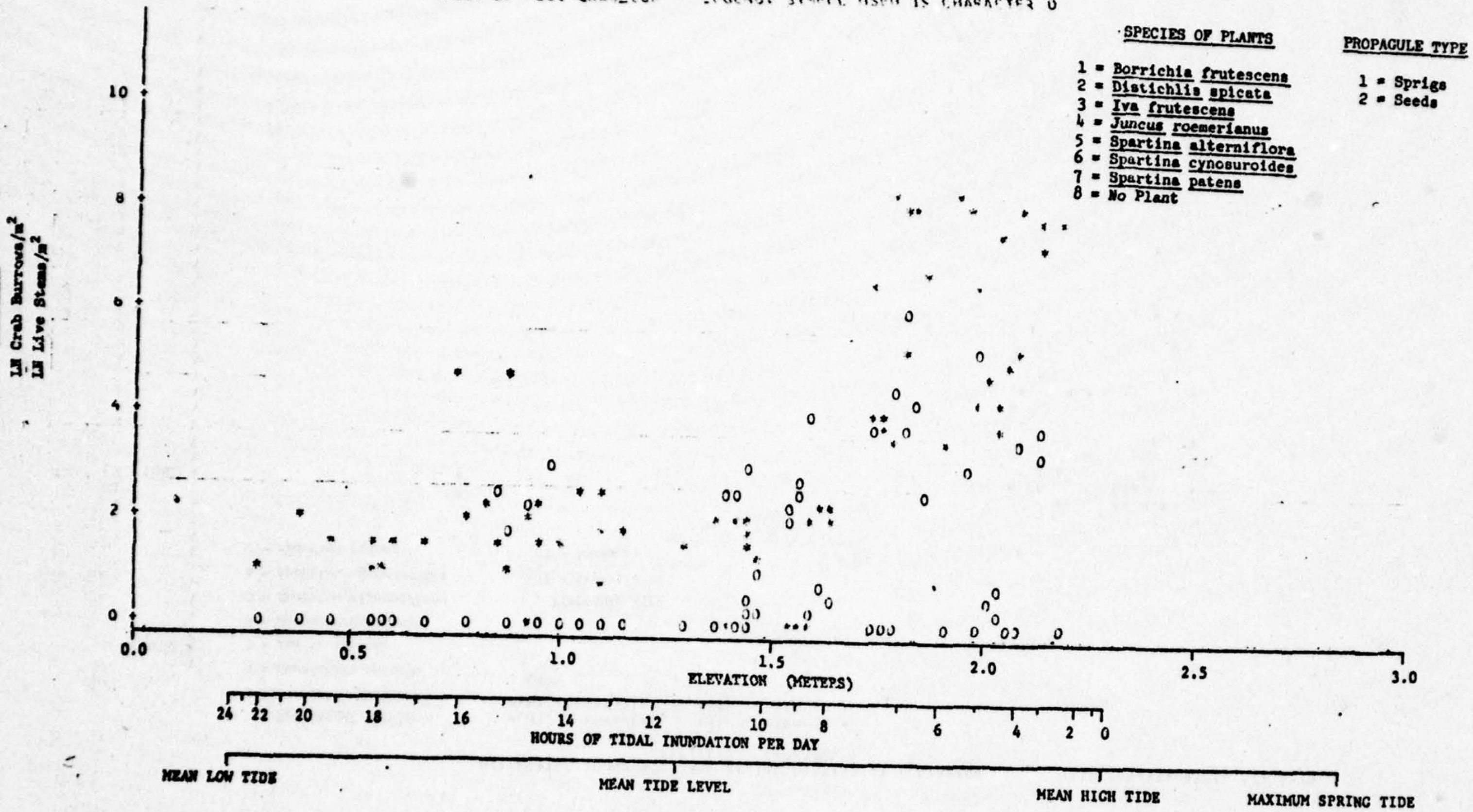
Note: Maximum Spring Tide = 2.7 Metres

D199

NATURAL LOGARITHMIC PLOT IF CULM DENSITY AND CRAB BURROWS DENSITY WITH TIME 2:44 THURSDAY, DECEMBER 22, 1977 44

SPECIES=7 PROP=1

PLOT OF ELEV*STEM_D LEGEND: SYMBOL USED IS CHARACTER *
PLOT OF ELEV*CRAB_BUR LEGEND: SYMBOL USED IS CHARACTER O

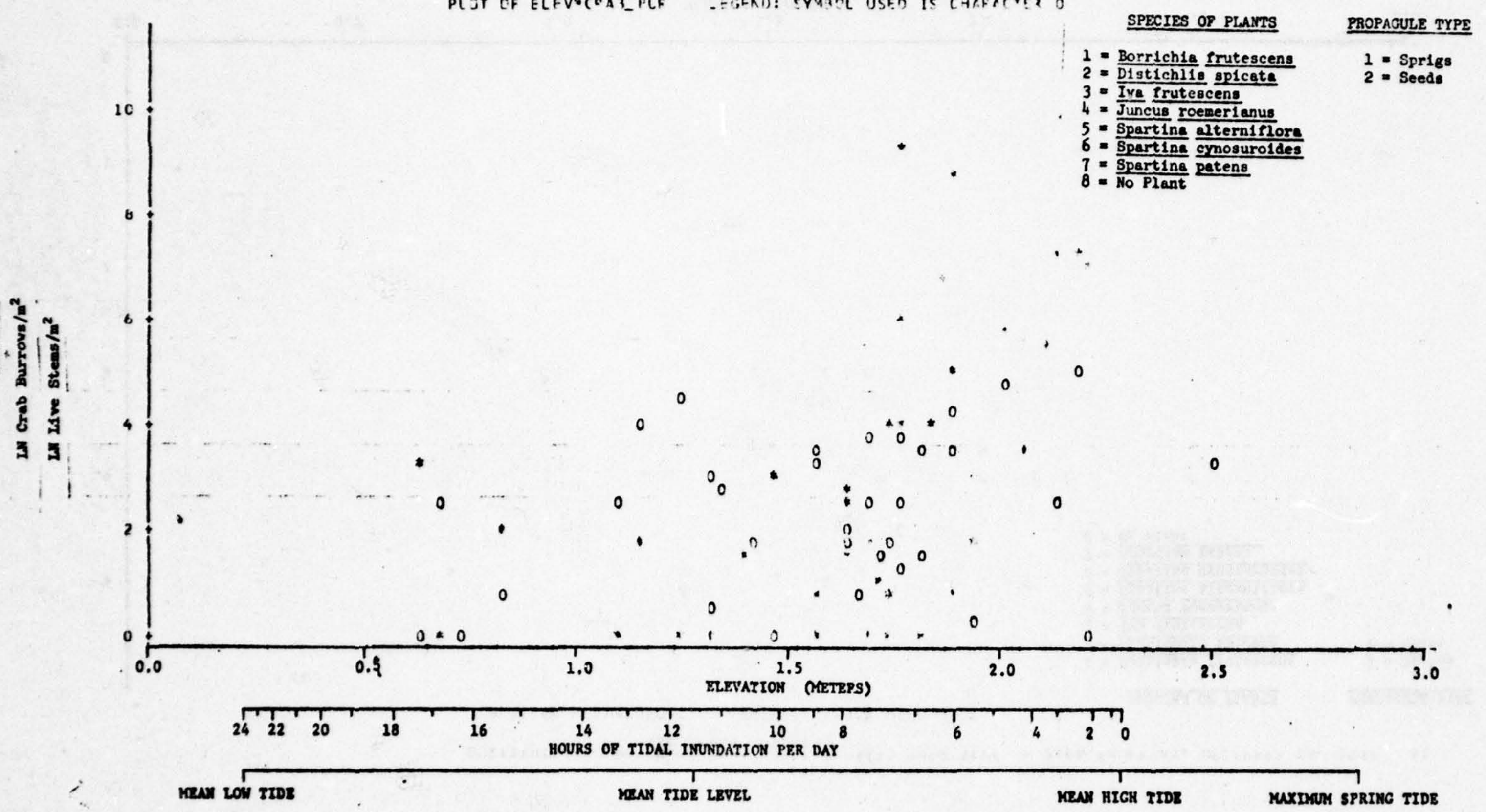


D200

NATURAL LOGARITHMIC PLOT IF CULM DENSITY AND CRAB BURROWS DENSITY WITH TIME 45
2:44 THURSDAY, DECEMBER 22, 1977

SPECIES=7 PROP=2

PLOT OF ELEV*STEM_L LEGEND: SYMBOL USED IS CHARACTER *
PLOT OF ELEV*CRAB_PLF LEGEND: SYMBOL USED IS CHARACTER 0

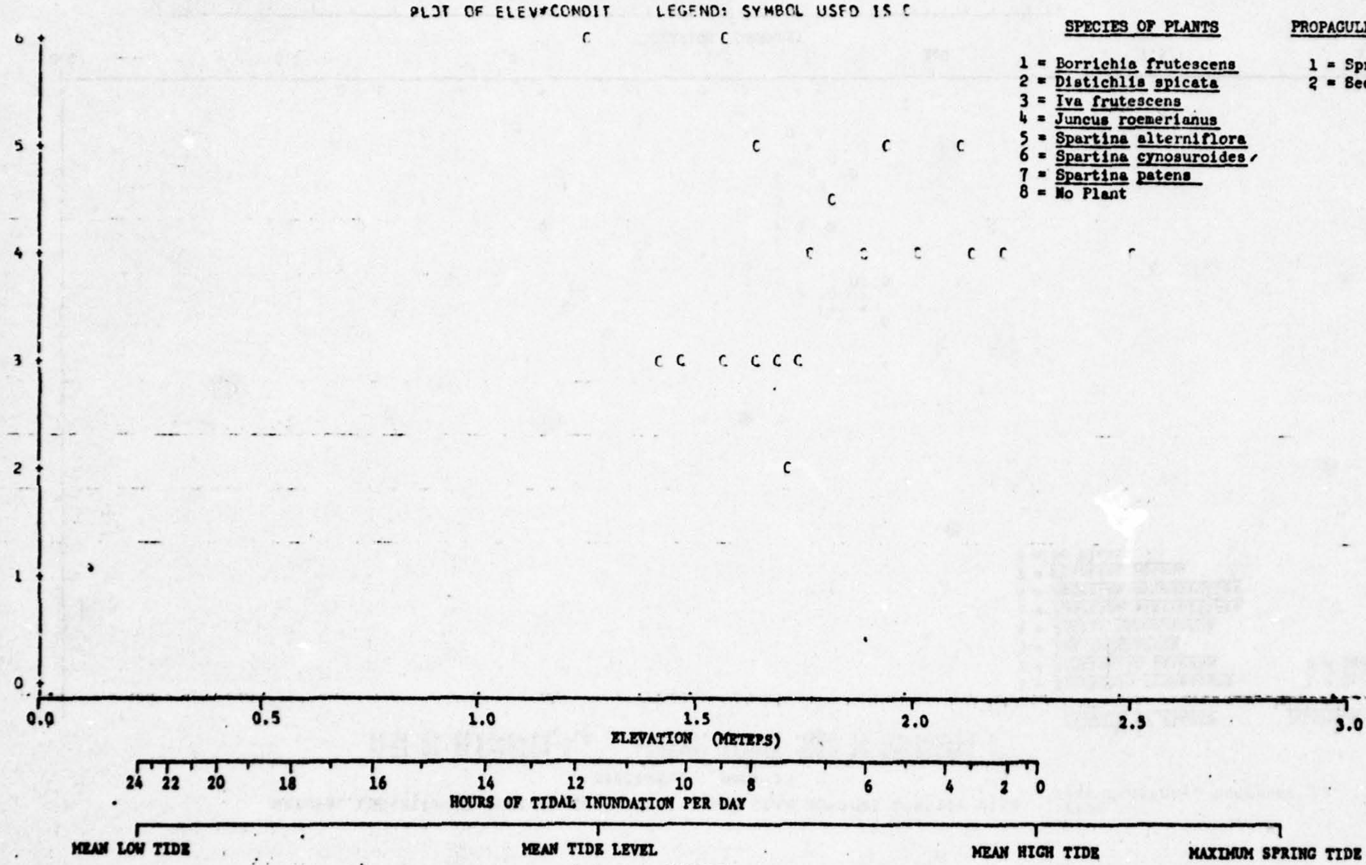


D201

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME 2:44 THURSDAY, DECEMBER 22, 1977 51

SPECIES=7 PROP=2

PLOT OF ELEV*CONDIT LEGEND: SYMBOL USED IS C



SPECIES OF PLANTS

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*
8 = No Plant

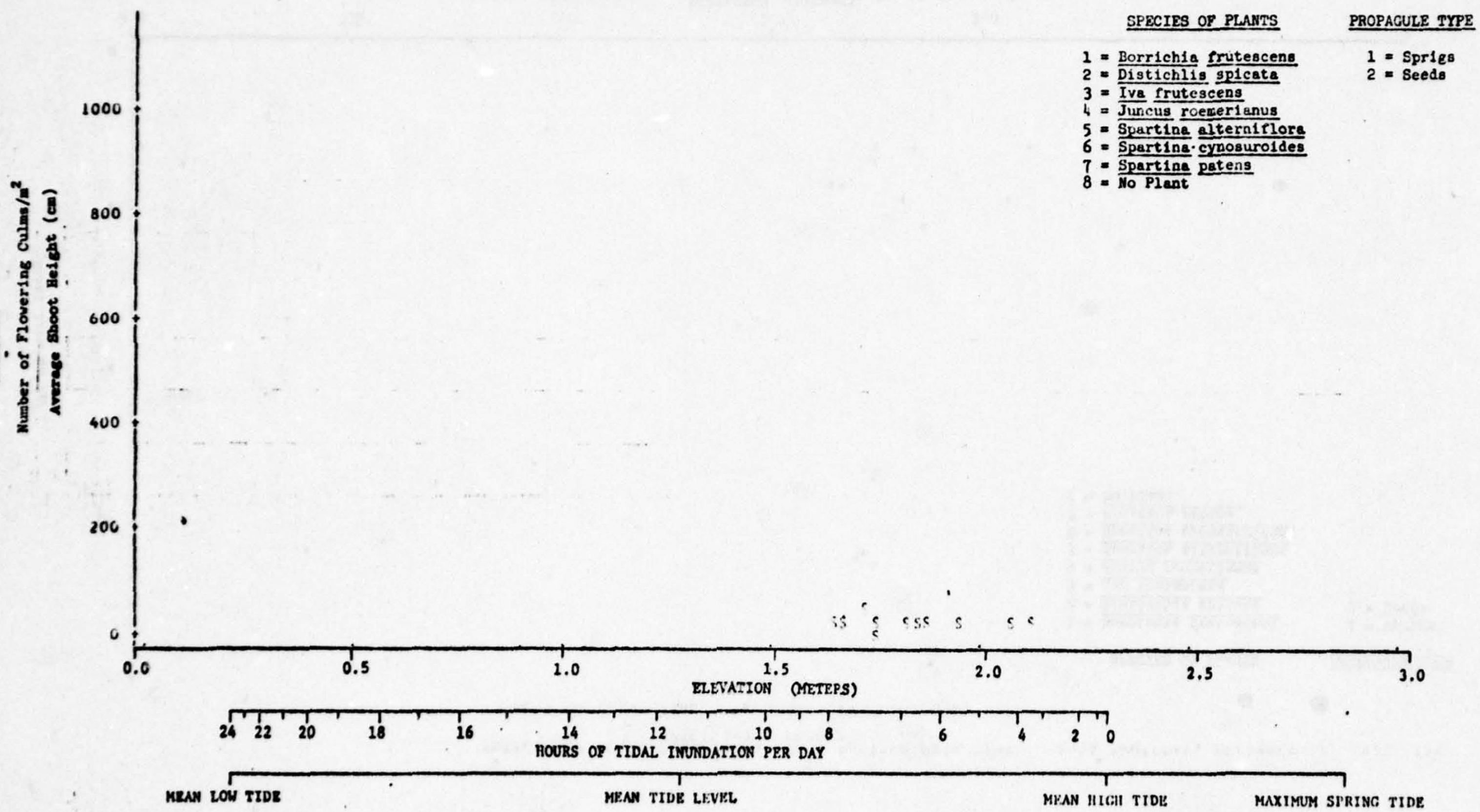
PROPAGULE TYPE

1 = Sprigs
2 = Seeds

D202

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   2:44 THURSDAY, DECEMBER 22, 1977   77
SPECIES=7   PROP=2

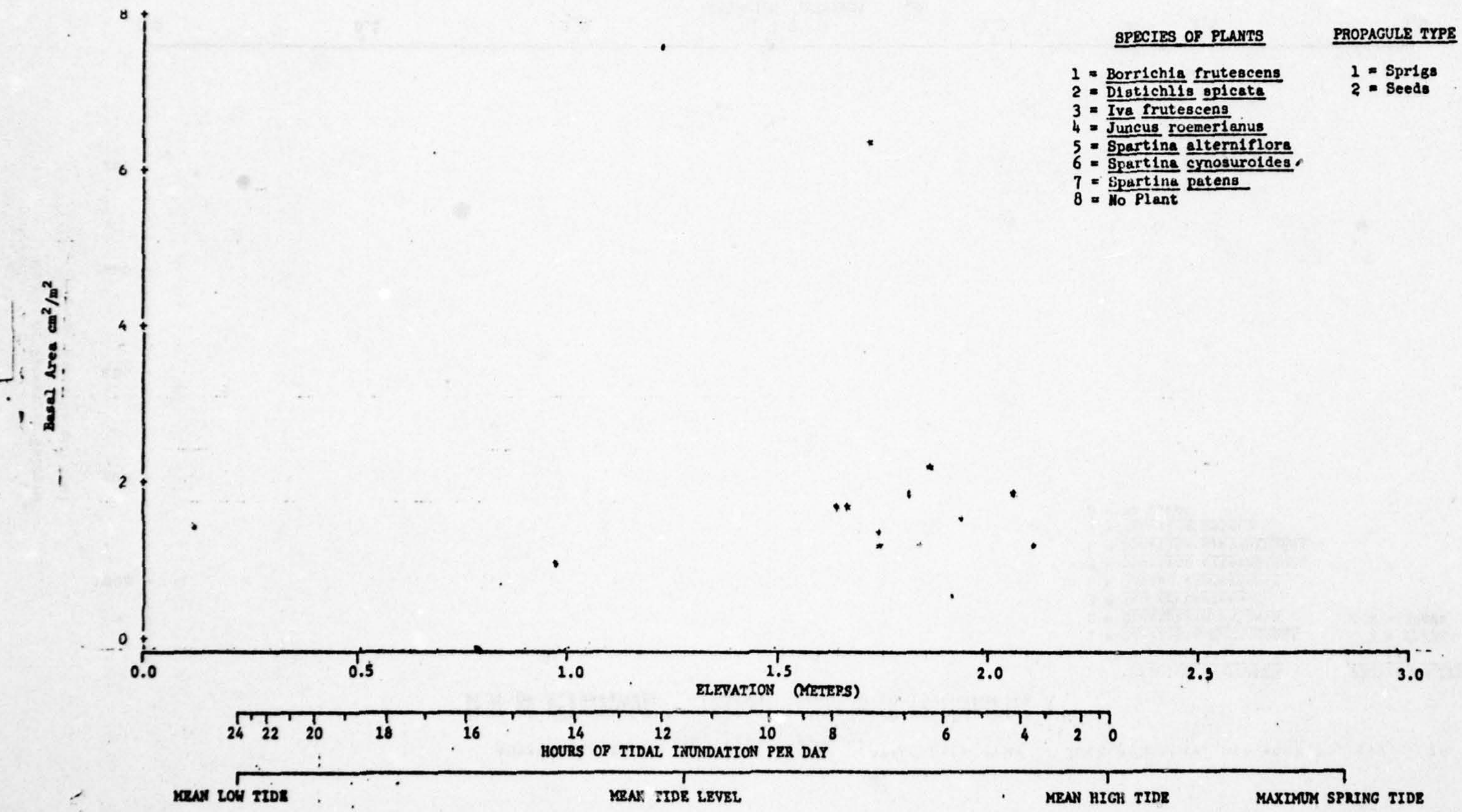
PLOT OF ELEV*SH_HT   LEGEND: SYMBOL USED IS CHARACTER S
PLOT OF ELEV*FLOWER   LEGEND: SYMBOL USED IS CHARACTER F



D203

BUTTERMILK SOUND PLANT PARAMETERS PLOTTED OVER TIME   2:44 THURSDAY, DECEMBER 22, 1977 125
SPECIES=7   PROP=2

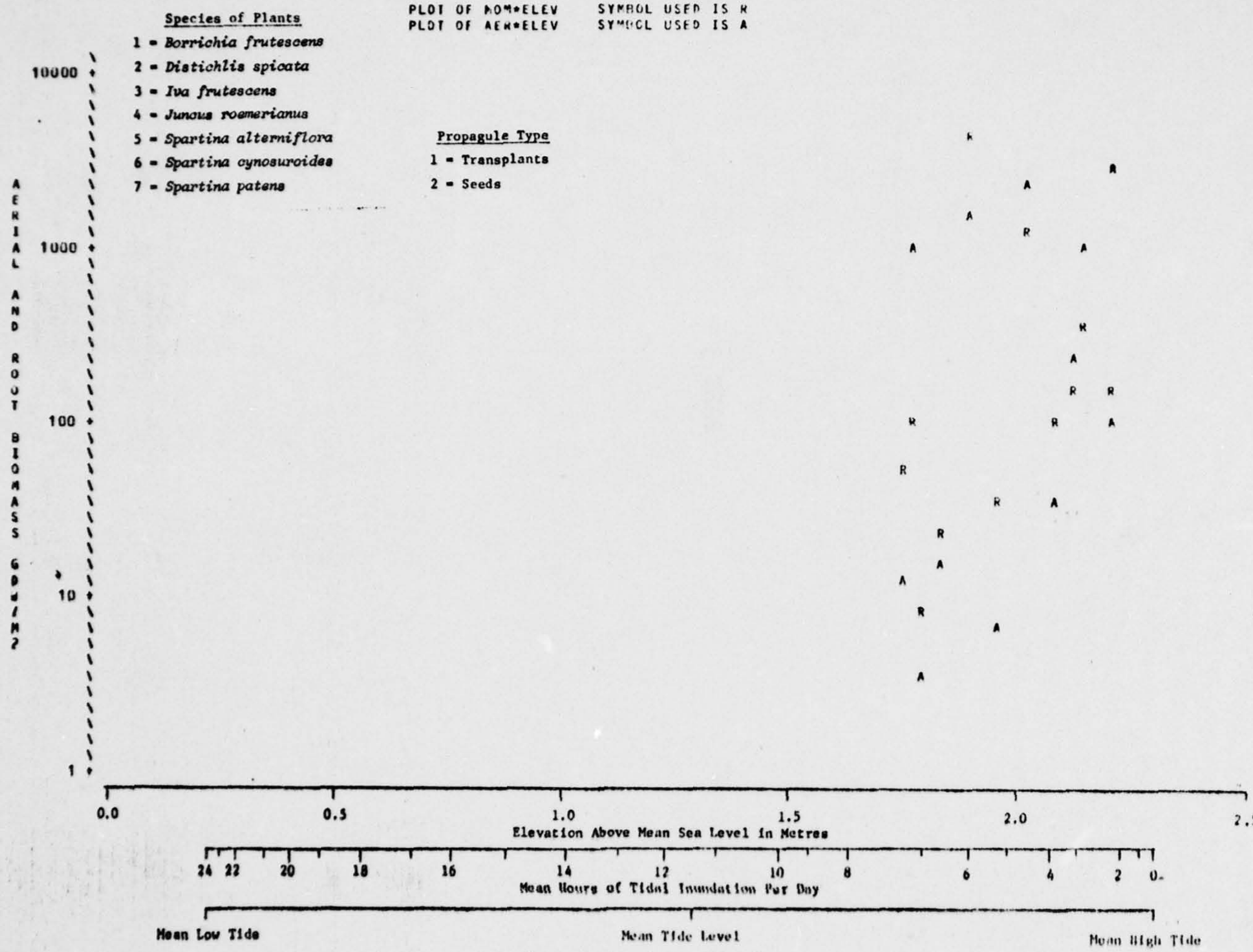
PLOT OF ELEV*BASAL   LEGEND: SYMBOL USED IS *



D204

BUTTERMILK SOUND ROOT AND AERIAL BIOMASS BY ELEVATION 9:14 MONDAY, APRIL 17, 1978 31
SPECIES=7 PROP=2

PLOT OF ROM*ELEV SYMBOL USED IS R
PLOT OF AER*ELEV SYMBOL USED IS A



Note: Maximum Spring Tide = 2.7 Metres

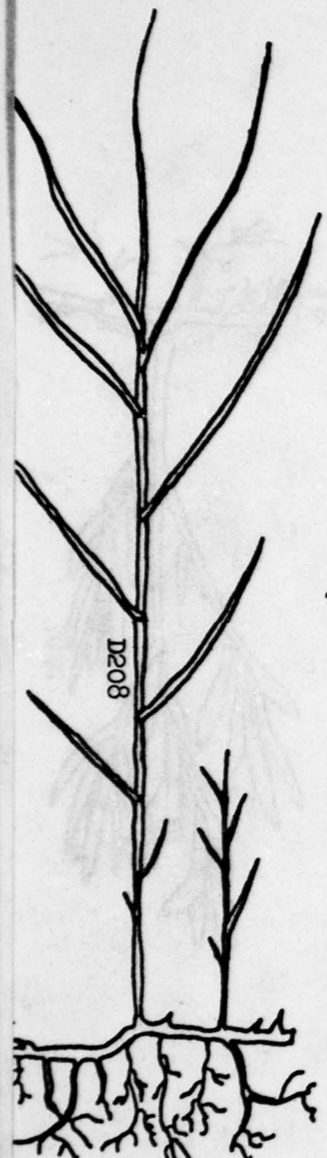
D205

PART 3

BORRICHIA FRUTESCENS

	JUNE 1975	NOVEMBER 1975	JUNE 1976	NOVEMBER 1976	MAY 1977	NOVEMBER 1977
STEM DENSITY (stems/m^2)	4	6	51	56	45	143
AERIAL BIOMASS (g/m^2)	4	19	90	357	74	318
MOM BIOMASS (g/m^2)	2	15	64	139	47	435
FLOWERING STEMS (stems/m^2)		0		7		20

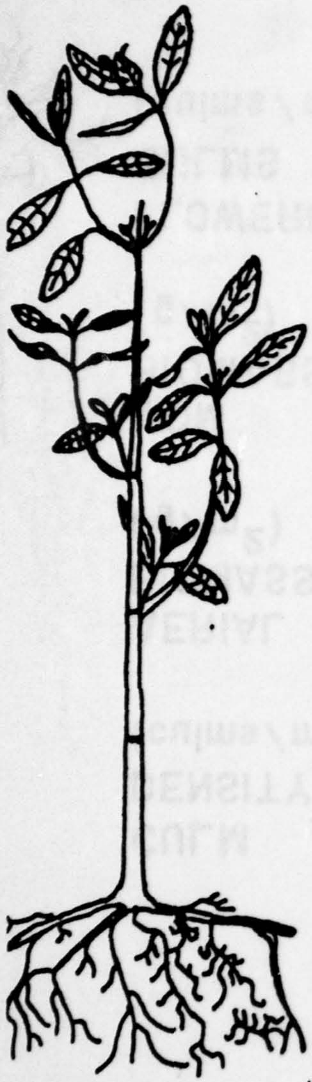
D207



D208

DISTICHLIS SPICATA

	JUNE 1975	NOVEMBER 1975	JUNE 1976	NOVEMBER 1976	MAY 1977	NOVEMBER 1977
CULM DENSITY (culms/m^2)	4	68	415	2313	1463	745
AERIAL BIOMASS (g/m^2)	1	24	49	608	218	248
MOM BIOMASS (g/m^2)	1	16	58	308	197	241
FLOWERING CULMS (culms/m^2)		0		488		5



IVA FRUTESCENS

	JUNE 1975	NOVEMBER 1975	JUNE 1976	NOVEMBER 1976	MAY 1977	NOVEMBER 1977
STEM DENSITY (stems/m^2)	4	4	2	2	2	83
AERIAL BIOMASS (g/m^2)	24	99	—	—	—	707
MOM BIOMASS (g/m^2)	8	49	—	—	—	954
FLOWERING STEMS (stems/m^2)		0		2		160

JUNCUS ROEMERIANUS

	JUNE 1975	NOVEMBER 1975	JUNE 1976	NOVEMBER 1976	MAY 1977	NOVEMBER 1977
CULM DENSITY (culms/m^2)	4	18	195	1321	223	1835
AERIAL BIOMASS (g/m^2)	1	5	69	699	125	1295
MOM BIOMASS (g/m^2)	2	7	52	613	99	1225
FLOWERING CULMS (culms/m^2)	0		1		217	

SPARTINA ALTERNIFLORA

	JUNE 1975	NOVEMBER 1975	JUNE 1976	NOVEMBER 1976	MAY 1977	NOVEMBER 1977
CULM DENSITY (culms/m^2)	4	29	75	154	71	216
AERIAL BIOMASS (g/m^2)	6	56	61	141	111	290
MOM BIOMASS (g/m^2)	5	119	193	167	132	311
FLOWERING CULMS (culms/m^2)		0		6		33

D212

SPARTINA CYNOSUROIDES

	JUNE 1975	NOVEMBER 1975	JUNE 1976	NOVEMBER 1976	MAY 1977	NOVEMBER 1977
CULM DENSITY (culms/m^2)	4	10	12	84	36	117
AERIAL BIOMASS (g/m^2)	2	15	—	178	54	352
MOM BIOMASS (g/m^2)	3	3	—	320	70	435
FLOWERING CULMS (culms/m^2)		0		2		31

SPARTINA PATENS

	JUNE 1975	NOVEMBER 1975	JUNE 1976	NOVEMBER 1976	MAY 1977	NOVEMBER 1977
CULM DENSITY (culms/m^2)	4	109	6840	4670	2271	3735
AERIAL BIOMASS (g/m^2)	1	95	3839	3602	1281	2198
MOM BIOMASS (g/m^2)	1	50	3921	1313	721	1986
FLOWERING CULMS (culms/m^2)		0		2		100

APPENDIX E

GRAPHIC REPRESENTATION OF ROOT TO
SHOOT RATIOS AND INTEGRATED BIOMASS

Parts 1-2

<u>Legend for Dependent Variable Codes</u>

Mom	=	Root biomass gdw/m^2.
Aer	=	Aerial biomass gdw/m^2.
IBiom_R	=	Integrated root biomass gdw/m^2.
IBiom_A		Integrated aerial biomass gdw/m^2.

<u>Legend for Species Codes</u>

1	=	*Borrichia frutescens*
2	=	*Distichlis spicata*
3	=	*Iva frutescens*
4	=	*Juncus roemerianus*
5	=	*Spartina alterniflora*
6	=	*Spartina cynosuroides*
7	=	*Spartina patens*
8	=	No plant (control)

<u>Part 1</u>

Root to Shoot ratios versus Elevation

<u>Part 2</u>

Integrated biomass versus Elevation November 1977

PART 1

ROOT TO SHOOT BIOMASS RATIOS FOR BUTTERMILK SOUND EXPERIMENTAL SPECIES 9:19 MONDAY, APRIL 17, 1978

SPECIES=1 CDATE=309

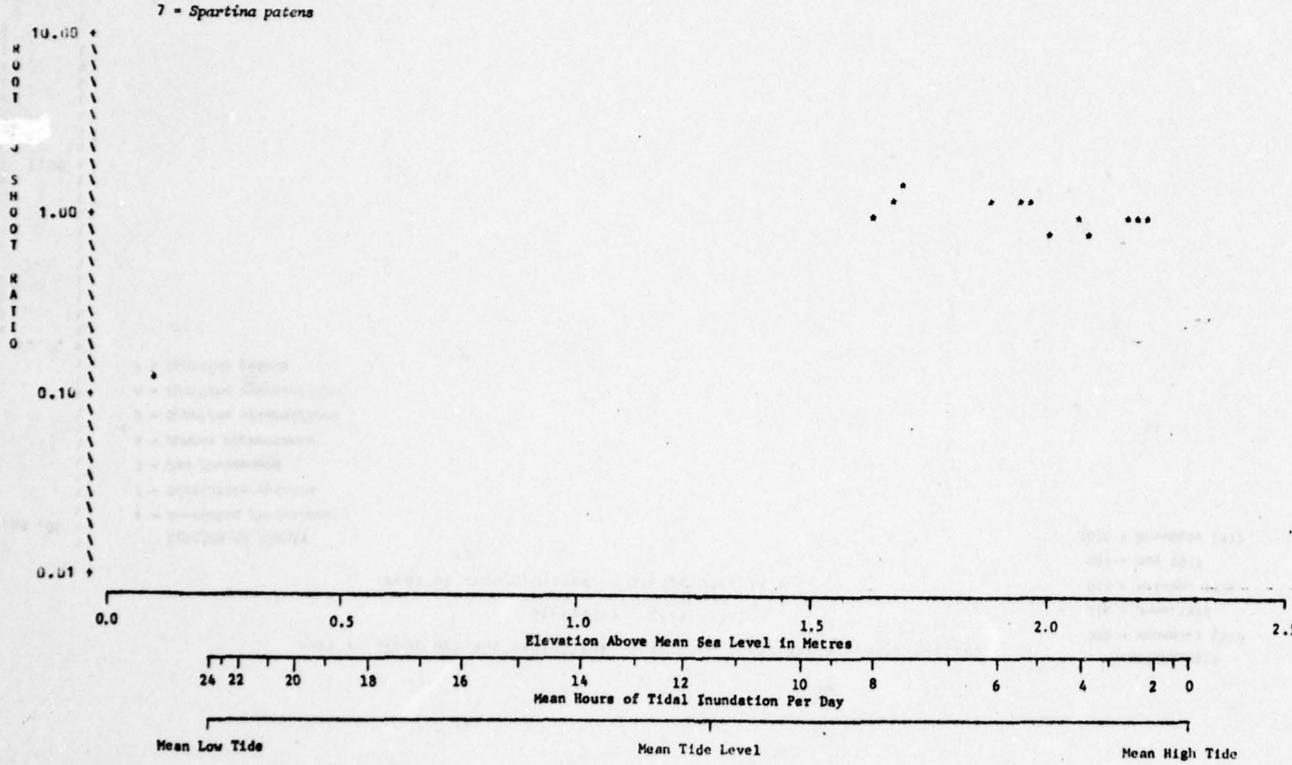
PLOT OF ROOT_SHO*ELEV SYMBOL USED IS *

Species of Plants

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*

Sampling Date

309 = November 1975
534 = June 1976
646 = October 1976
869 = May 1977
1036 = November 1977



Note: Maximum Spring Tide = 2.7 Metres

E3

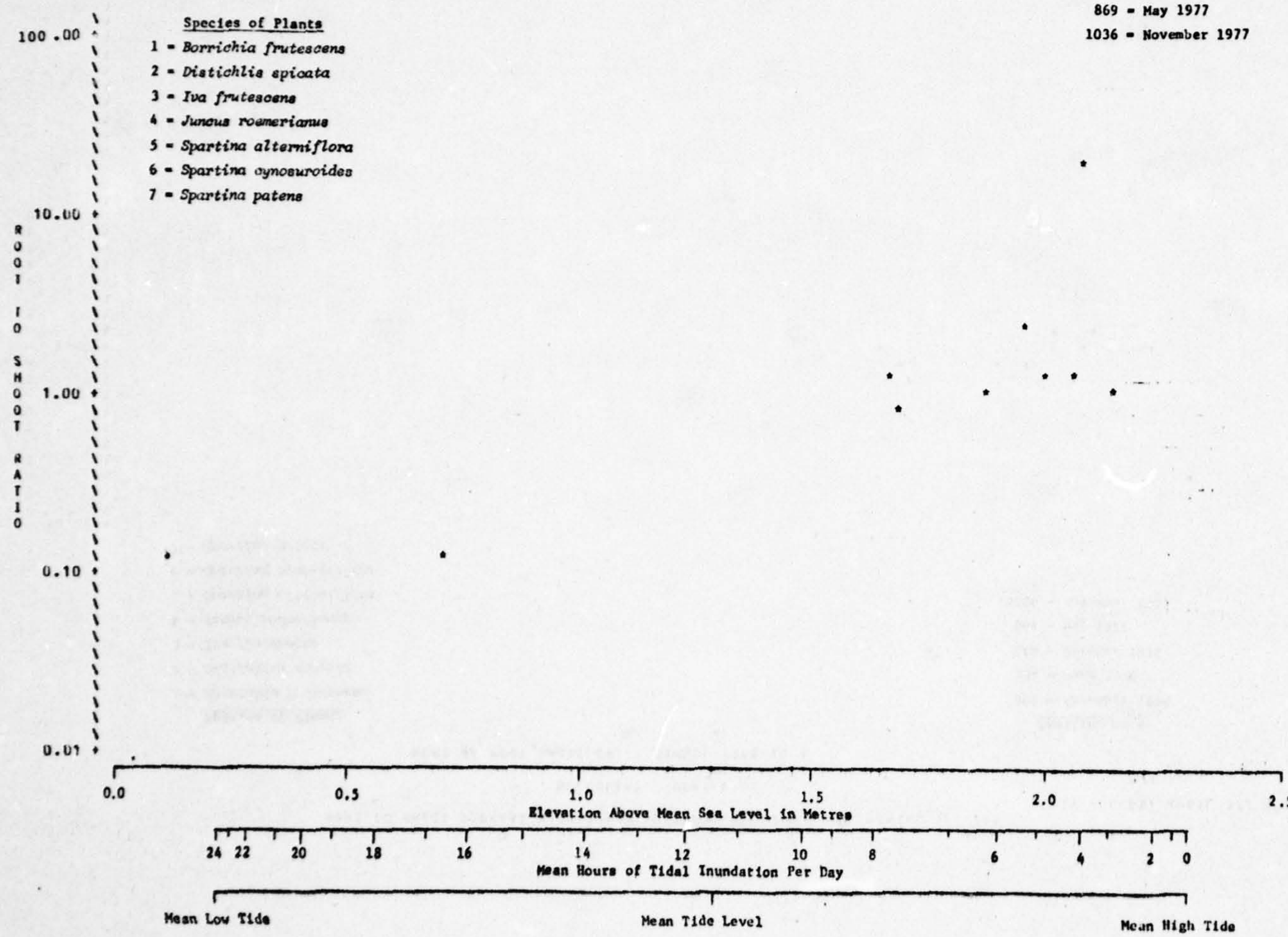
ROOT TO SHOOT BIOMASS RATIOS FOR BUTTERMILK SOUND EXPERIMENTAL SPECIES

SPECIES=1 CDATE=534

PLOT OF ROOT_SHO*ELEV SYMBOL USED IS *

Sampling Date

309 = November 1975
534 = June 1976
646 = October 1976
869 = May 1977
1036 = November 1977



Note: Maximum Spring Tide = 2.7 Metres

E4

ROOT TO SHOOT BIOMASS RATIOS FOR BUTTERMILK SOUND EXPERIMENTAL SPECIES 9:19 MONDAY, APRIL 17, 1978

SPECIES=1 CDATE=646

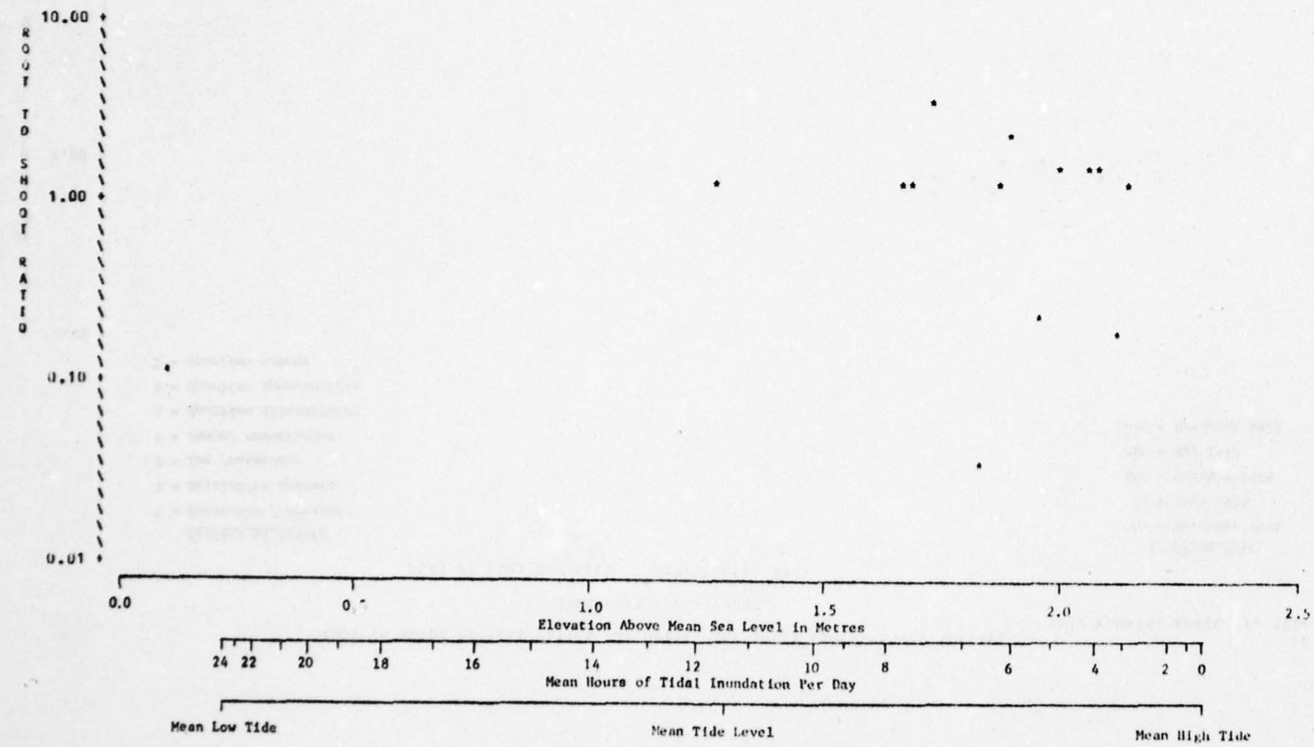
PLOT OF ROOT_SHO*ELEV SYMBOL USED IS *

Species of Plants

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*

Sampling Date

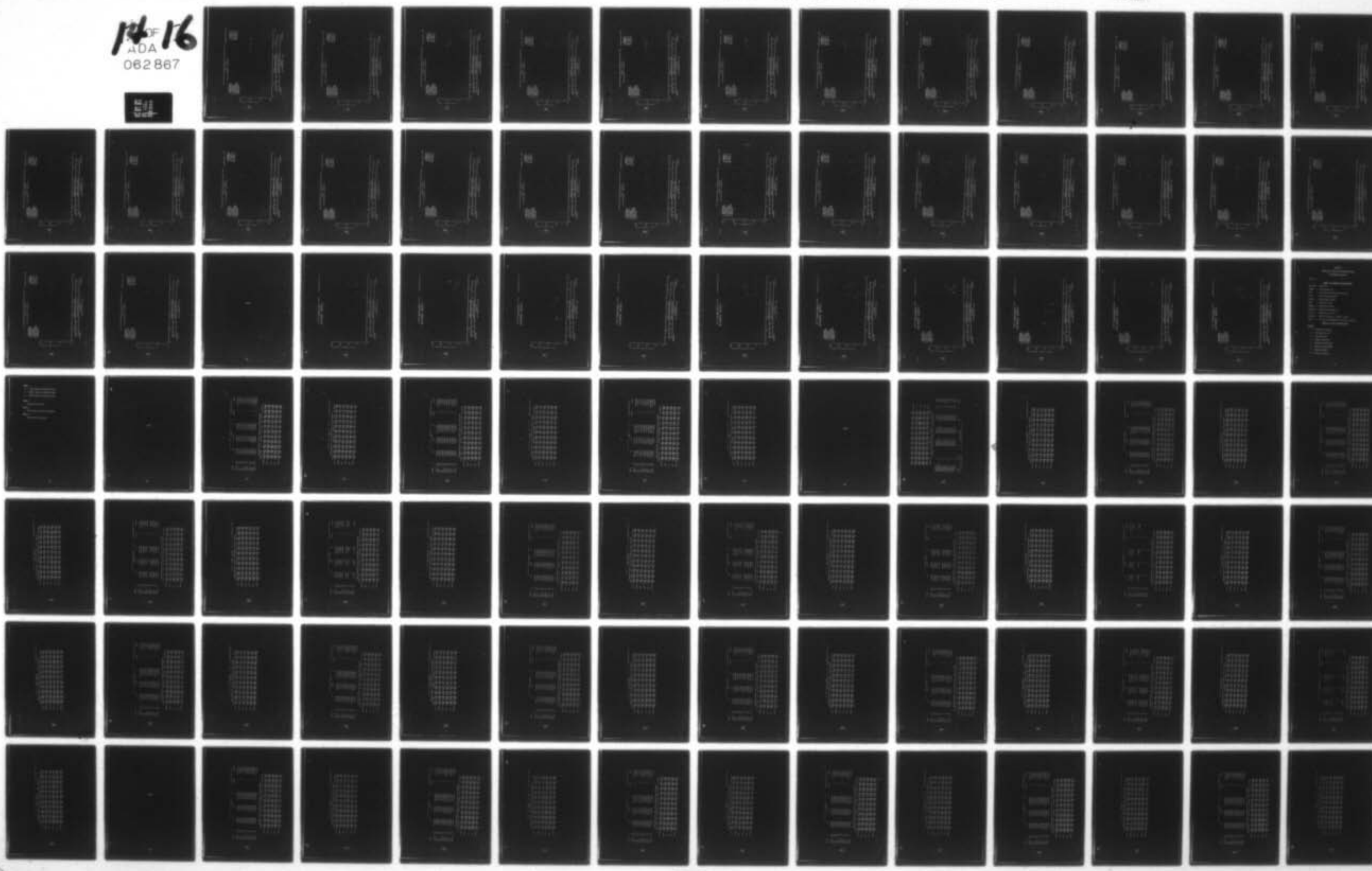
309 = November 1975
534 = June 1976
646 = October 1976
869 = May 1977
1036 = November 1977



Note: Maximum Spring Tide = 2.7 Metres

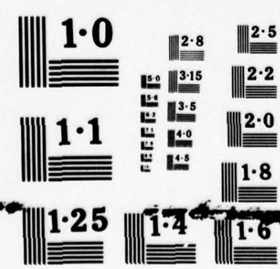
AD-A062 867 GEORGIA UNIV BRUNSWICK MARINE EXTENSION SERVICE F/G 13/2
HABITAT DEVELOPMENT FIELD INVESTIGATIONS BUTTERMILK SOUND MARSH--ETC(U)
JUL 78 R J REIMOLD, M A HARDISKY, P C ADAMS DACW21-75-C-0074
UNCLASSIFIED WES-TR-D-78-26-APP-A NL

14 OF 16
ADA
062867



14 OF 16

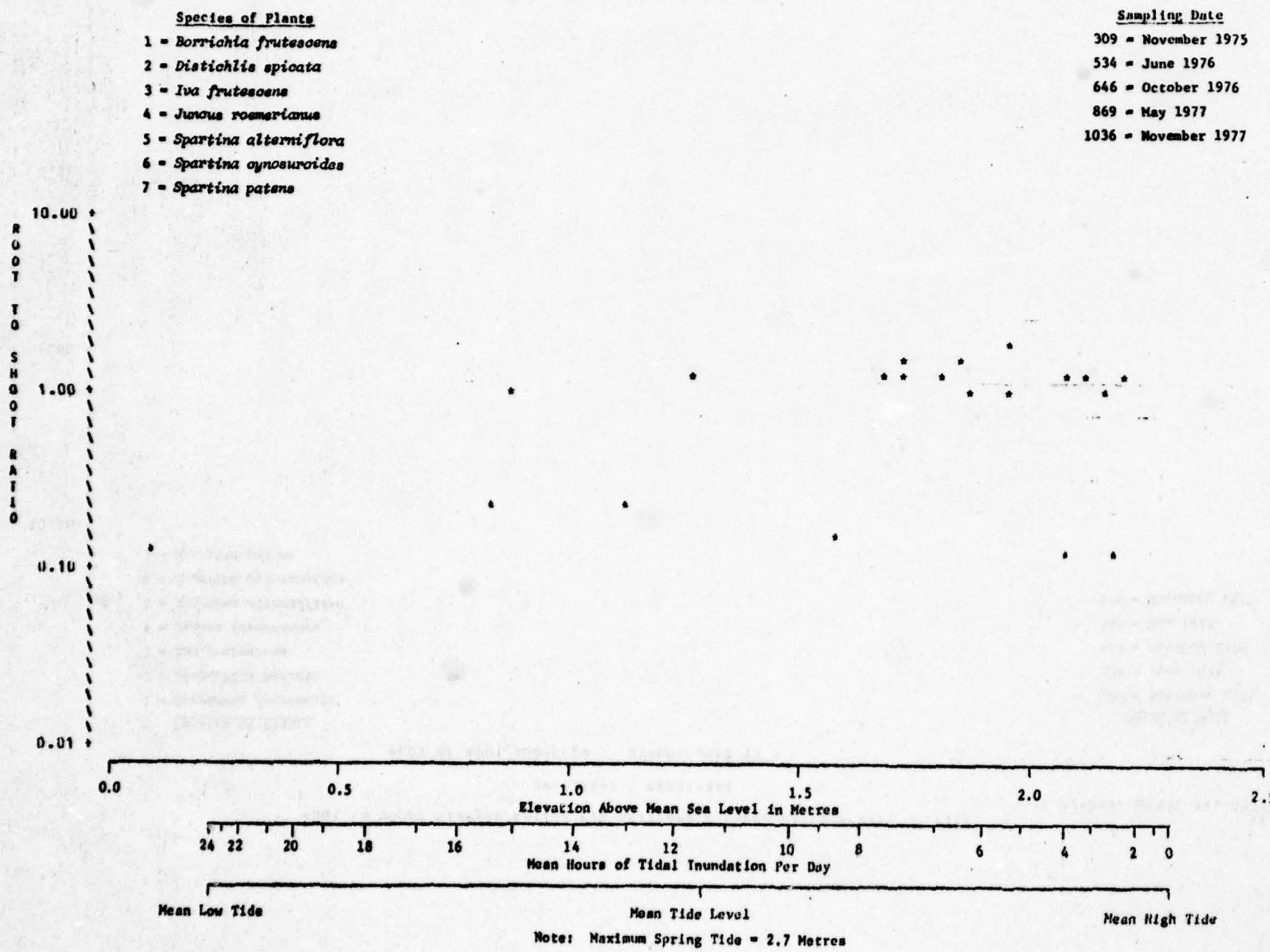
ADA
062867



ROOT TO SHOOT BIOMASS RATIOS FOR BUTTERMILK SOUND EXPERIMENTAL SPECIES 9:19 MONDAY, APRIL 17, 1978 27

SPECIES=1 CDATE=869

PLOT OF ROOT_SHO*ELEV SYMBOL USED IS *



E6

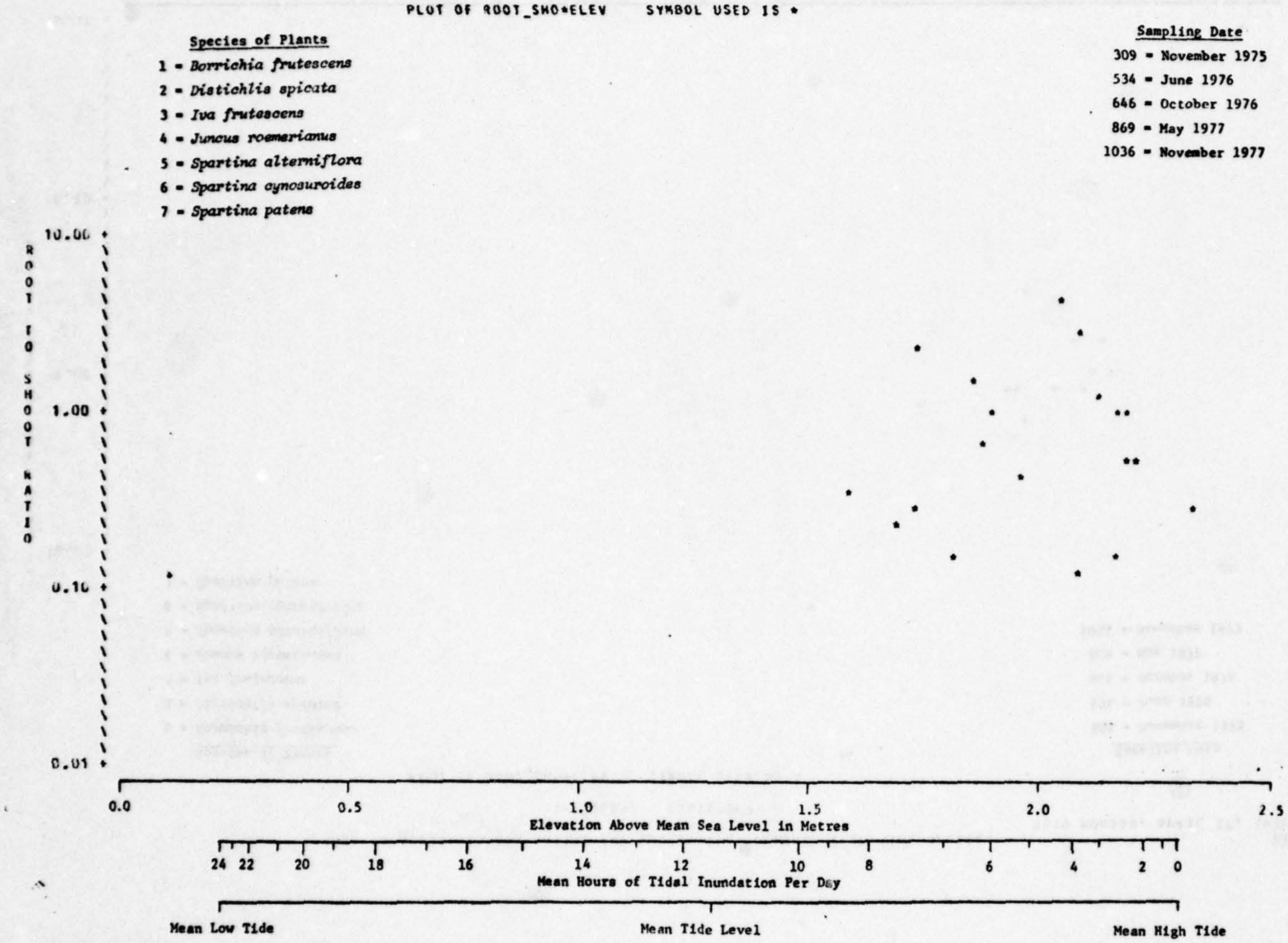
ROOT TO SHOOT BIOMASS RATIOS FOR BUTTERMILK SOUND EXPERIMENTAL SPECIES

9:19 MONDAY, APRIL 17, 1978

26

SPECIES=1 CDATE=1036

PLOT OF ROOT_SHO*ELEV SYMBOL USED IS *



Note: Maximum Spring Tide = 2.7 Metres

E7

ROOT TO SHOOT BIOMASS RATIOS FOR BUTTERMILK SOUND EXPERIMENTAL SPECIES 9:19 MONDAY, APRIL 17, 1978 29

SPECIES=2 CDATE=309

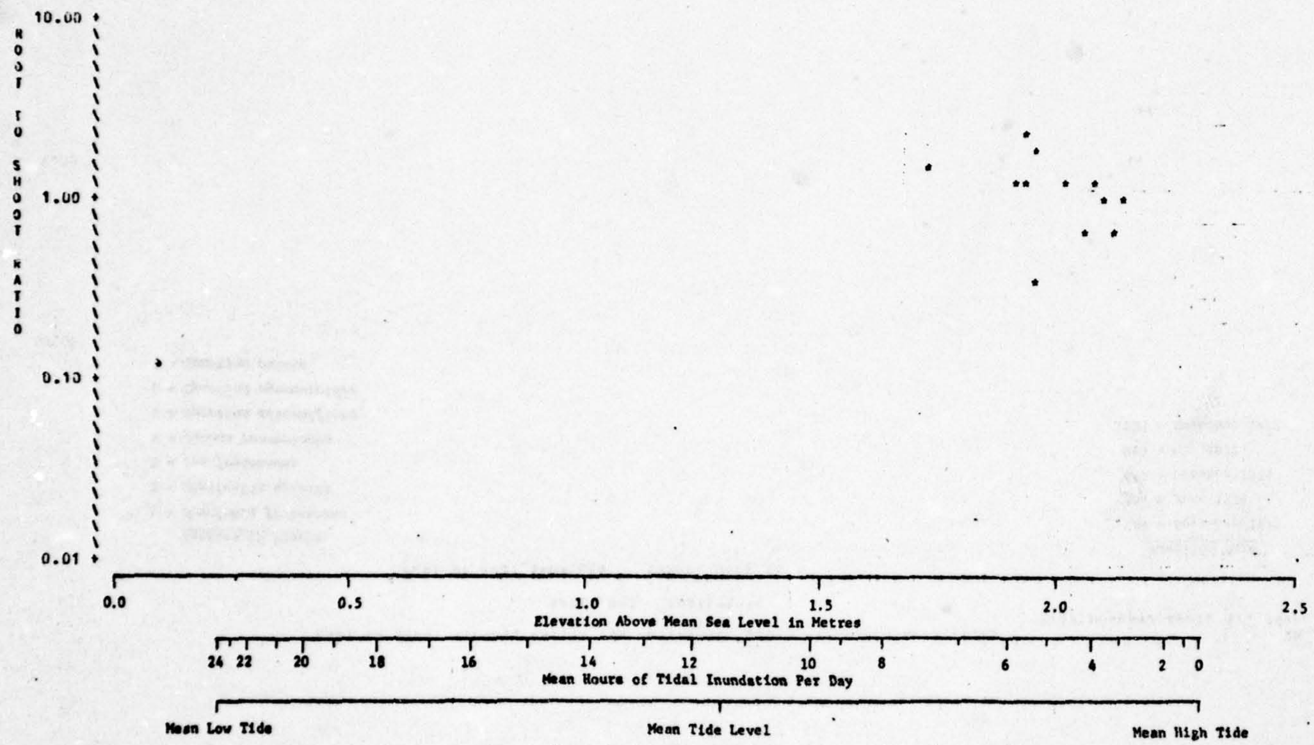
PLOT OF ROOT_SHO*ELEV SYMBOL USED IS *

Species of Plants

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*

Sampling Date

309 = November 1975
534 = June 1976
646 = October 1976
869 = May 1977
1036 = November 1977



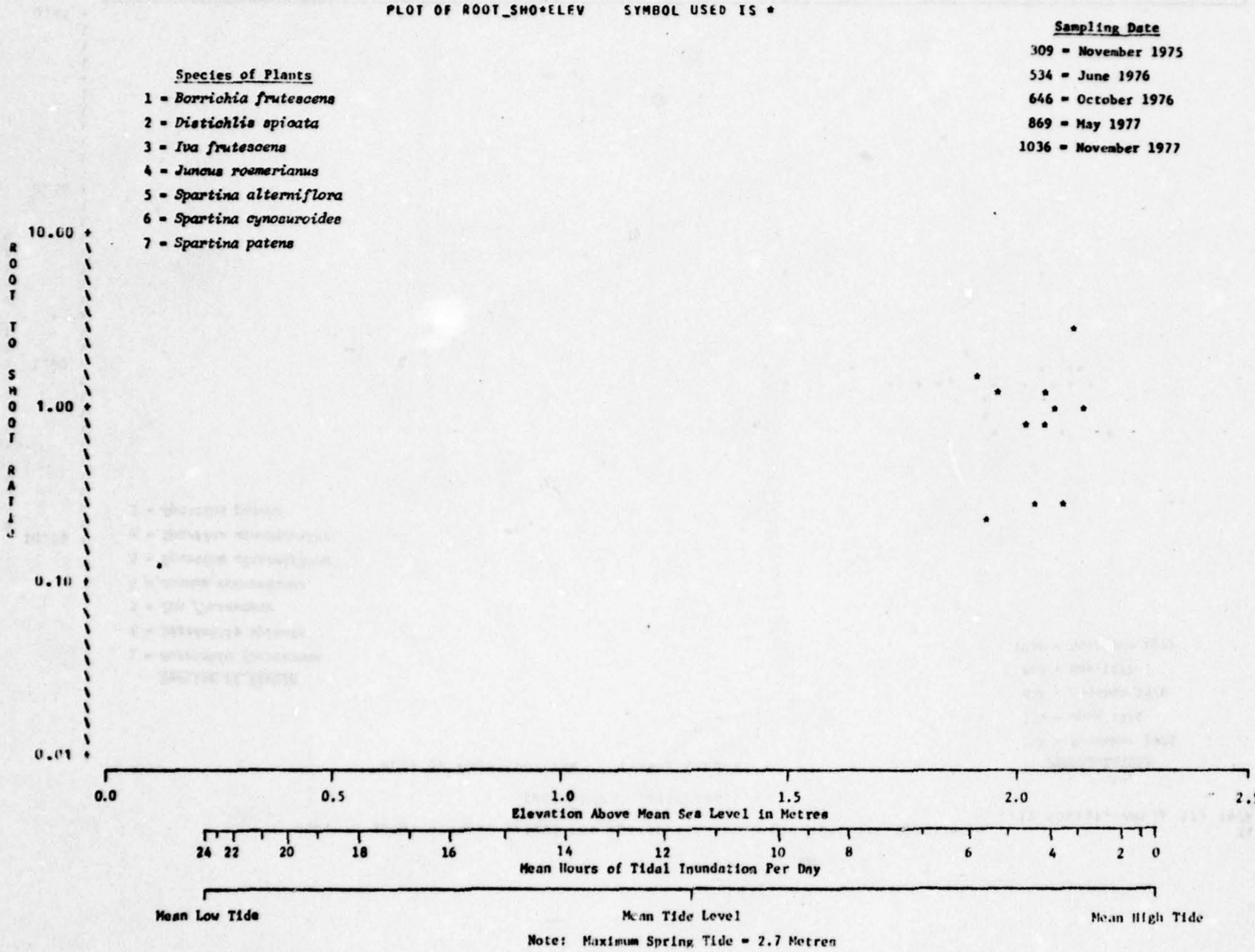
Note: Maximum Spring Tide = 2.7 Metres

E8

ROOT TO SHOOT BIOMASS RATIOS FOR BUTTERMILK SOUND EXPERIMENTAL SPECIES 9:19 MONDAY, APRIL 17, 1978 30

SPECIES=2 CDATE=534

PLOT OF ROOT_SHO*ELEV SYMBOL USED IS *

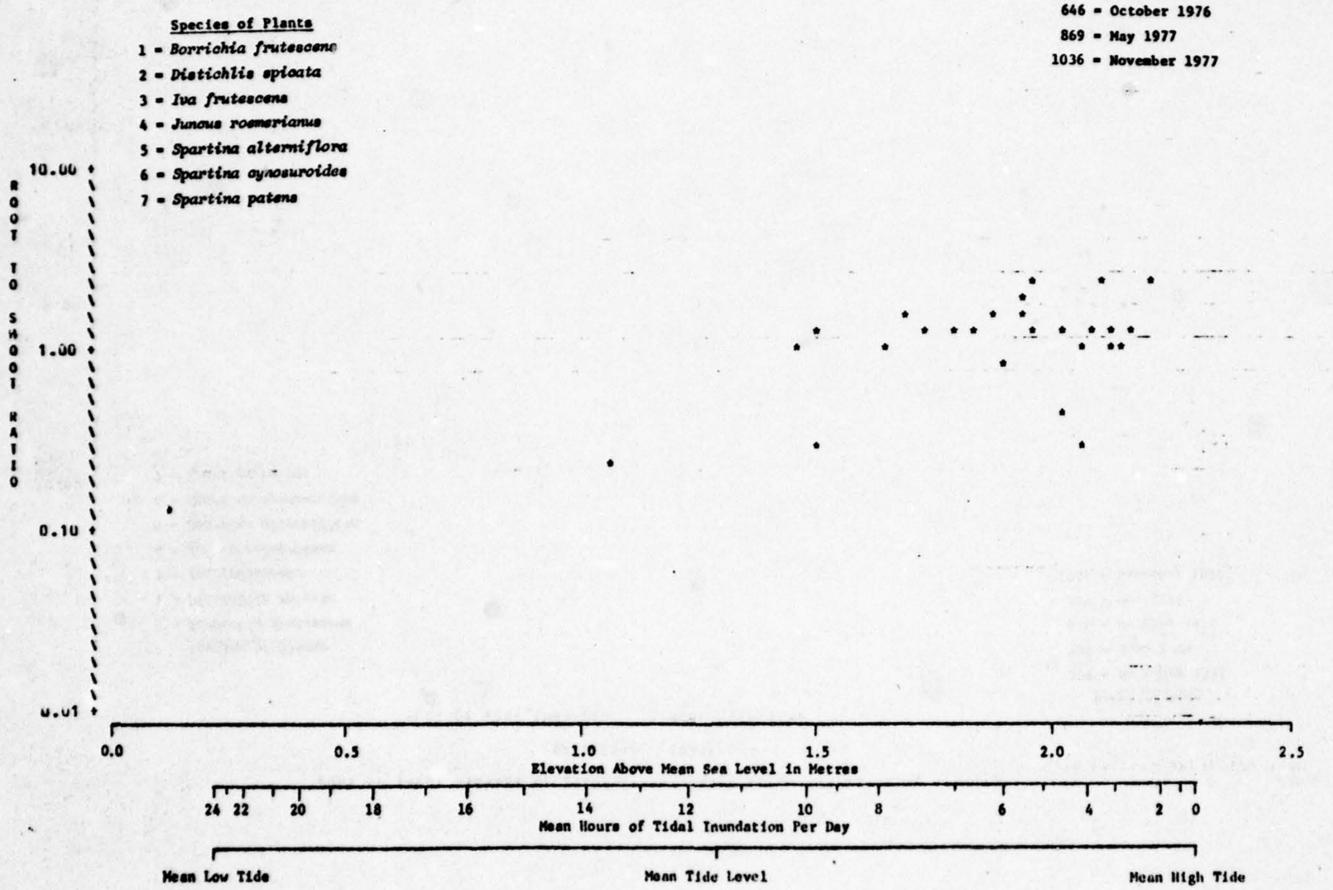


ROOT TO SHOOT BIOMASS RATIOS FOR BUTTERMILK SOUND EXPERIMENTAL SPECIES

9:19 MONDAY, APRIL 17, 1978 51

SPECIES=2 DATE=646

PLOT OF ROOT_SHO*ELEV SYMBOL USED IS *



Note: Maximum Spring Tide = 2.7 Metres

E10

ROOT TO SHOOT BIOMASS RATIOS FOR BUTTERMILK SOUND EXPERIMENTAL SPECIES

9:19 MONDAY, APRIL 17, 1978

SPECIES=7 CDATE=869

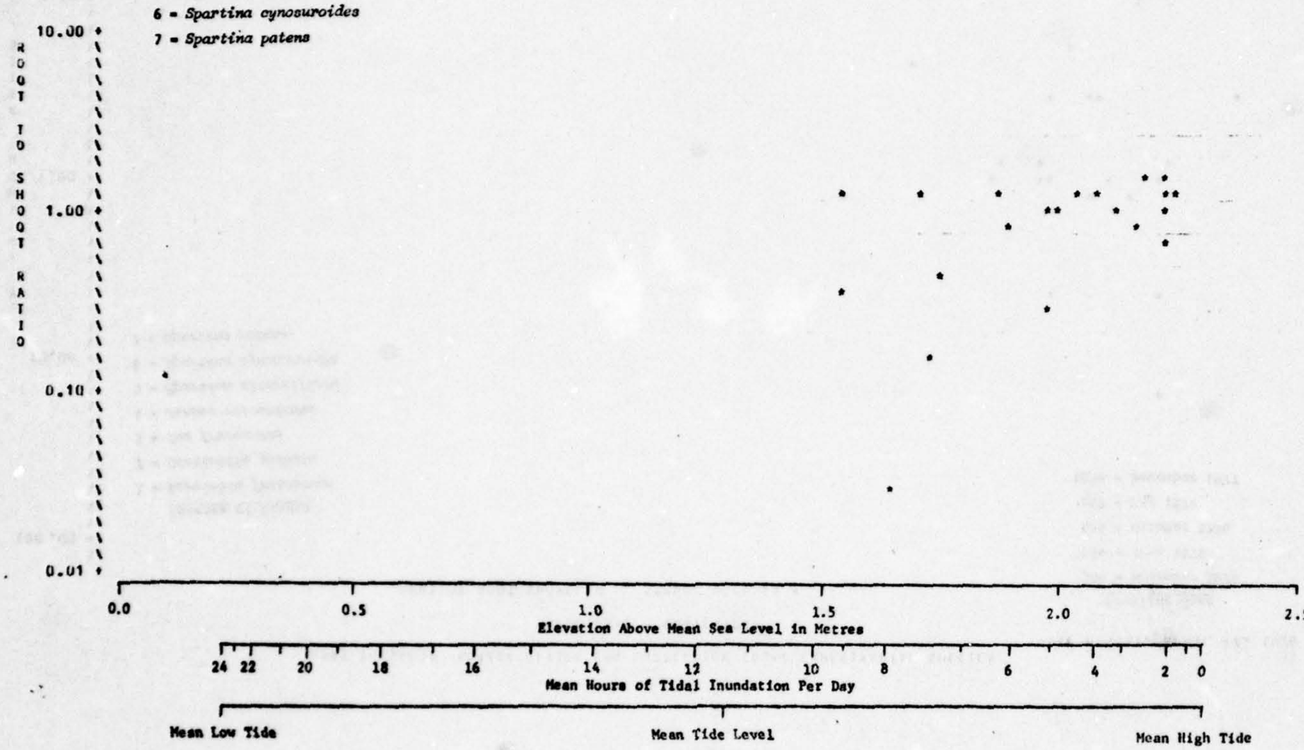
PLOT OF ROOT_SHO*ELEV SYMBOL USED IS *

Species of Plants

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*

Sampling Date

309 = November 1975
534 = June 1976
646 = October 1976
869 = May 1977
1036 = November 1977

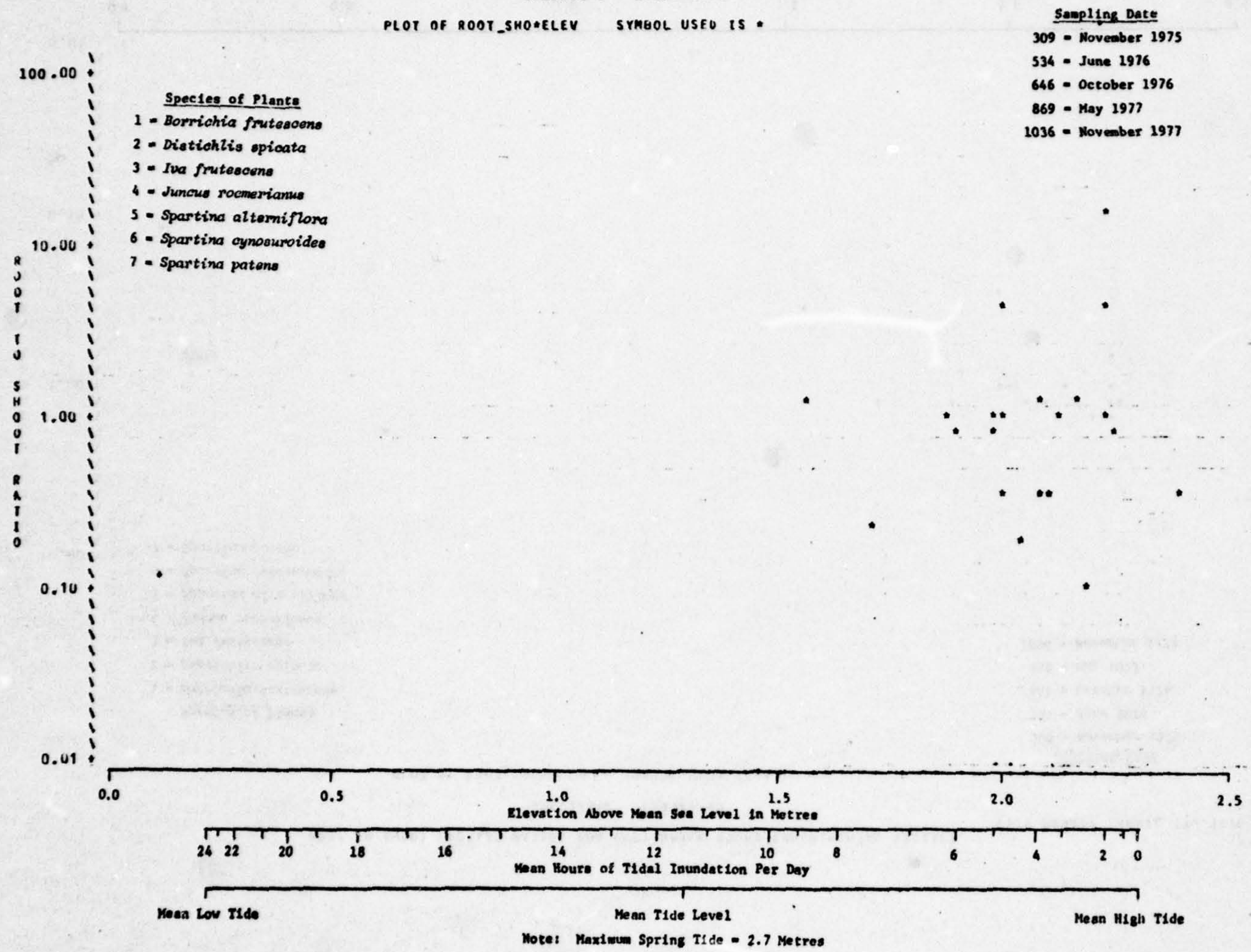


Note: Maximum Spring Tide = 2.7 Metres

ROOT TO SHOOT BIOMASS RATIOS FOR BUTTERMILK SOUND EXPERIMENTAL SPECIES 9:19 MONDAY, APRIL 17, 1978 33

SPECIES=2 CDATE=1036

PLOT OF ROOT_SHO*ELEV SYMBOL USED IS *

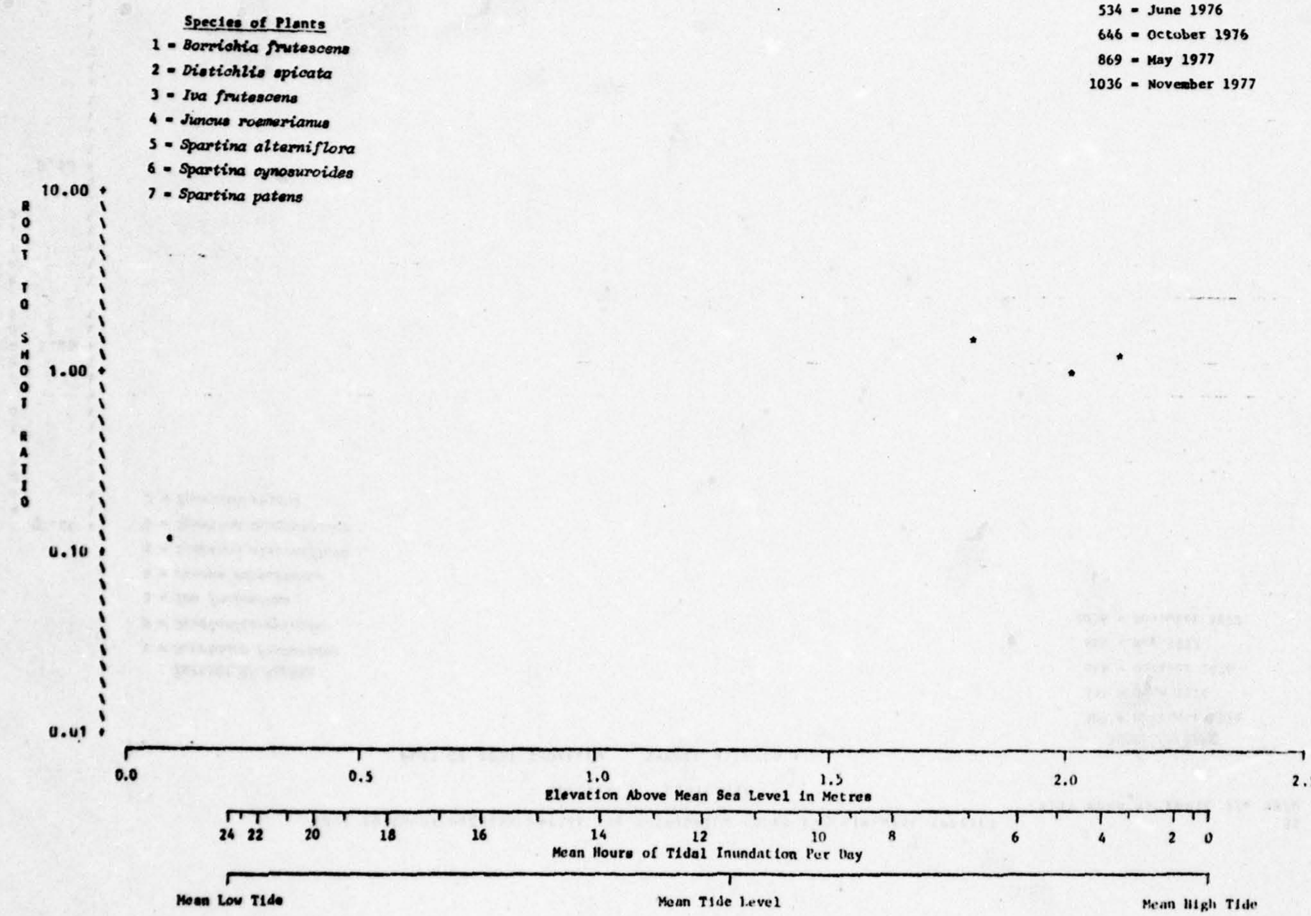


E12

ROOT TO SHOOT BIOMASS RATIOS FOR BUTTERMILK SOUND EXPERIMENTAL SPECIES 9:19 MONDAY, APRIL 17, 1978 34

SPECIES=3 CDATE=309

PLOT OF ROOT_SHO*ELEV SYMBOL USED IS *



Note: Maximum Spring Tide = 2.7 Metres

E13

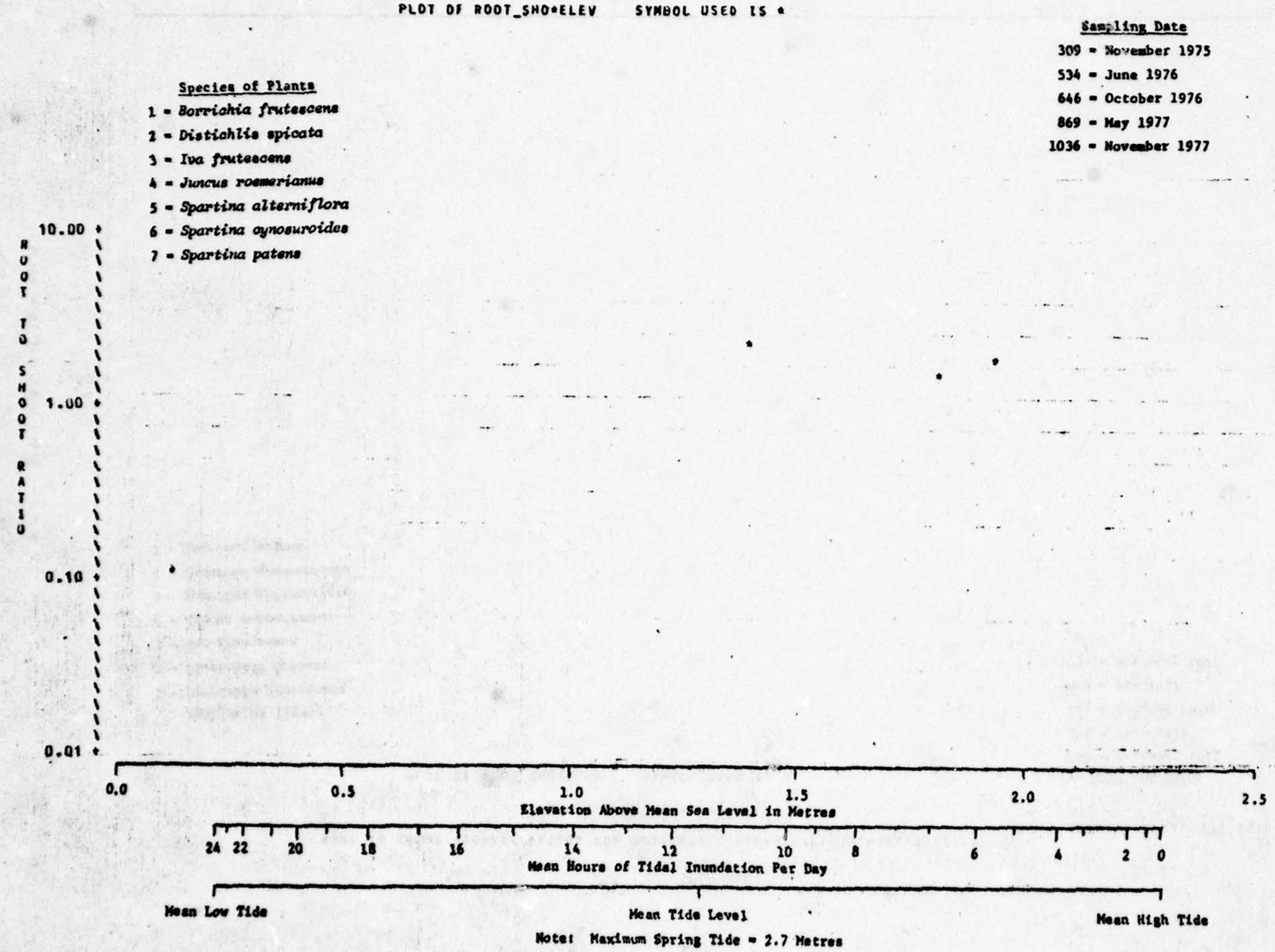
ROOT TO SHOOT BIOMASS RATIOS FOR BUTTERMILK SOUND EXPERIMENTAL SPECIES

35

9:19 MONDAY, APRIL 17, 1978

SPECIES=3 CDATE=646

PLOT OF ROOT_SHO*ELEV SYMBOL USED IS *



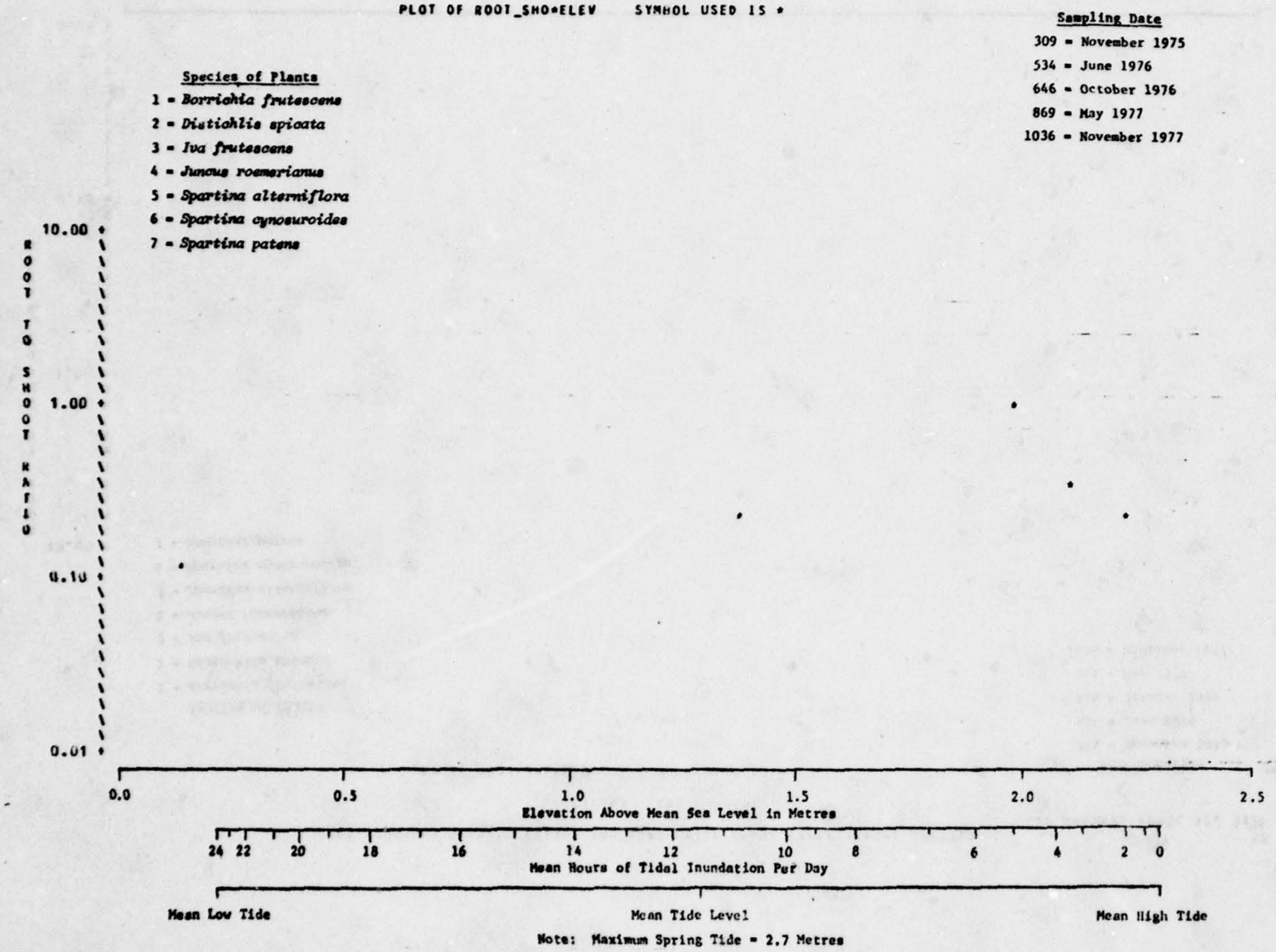
E14

ROOT TO SHOOT BIOMASS RATIOS FOR BUTTERMILK SOUND EXPERIMENTAL SPECIES 36

9:19 MONDAY, APRIL 17, 1978

SPECIES=3 CDATE=869

PLOT OF ROOT_SHO*ELEV SYMBOL USED IS *



E15

ROOT TO SHOOT BIOMASS RATIOS FOR BUTTERMILK SOUND EXPERIMENTAL SPECIES 37

9:19 MONDAY, APRIL 17, 1978

SPECIES=3 CDATE=1036

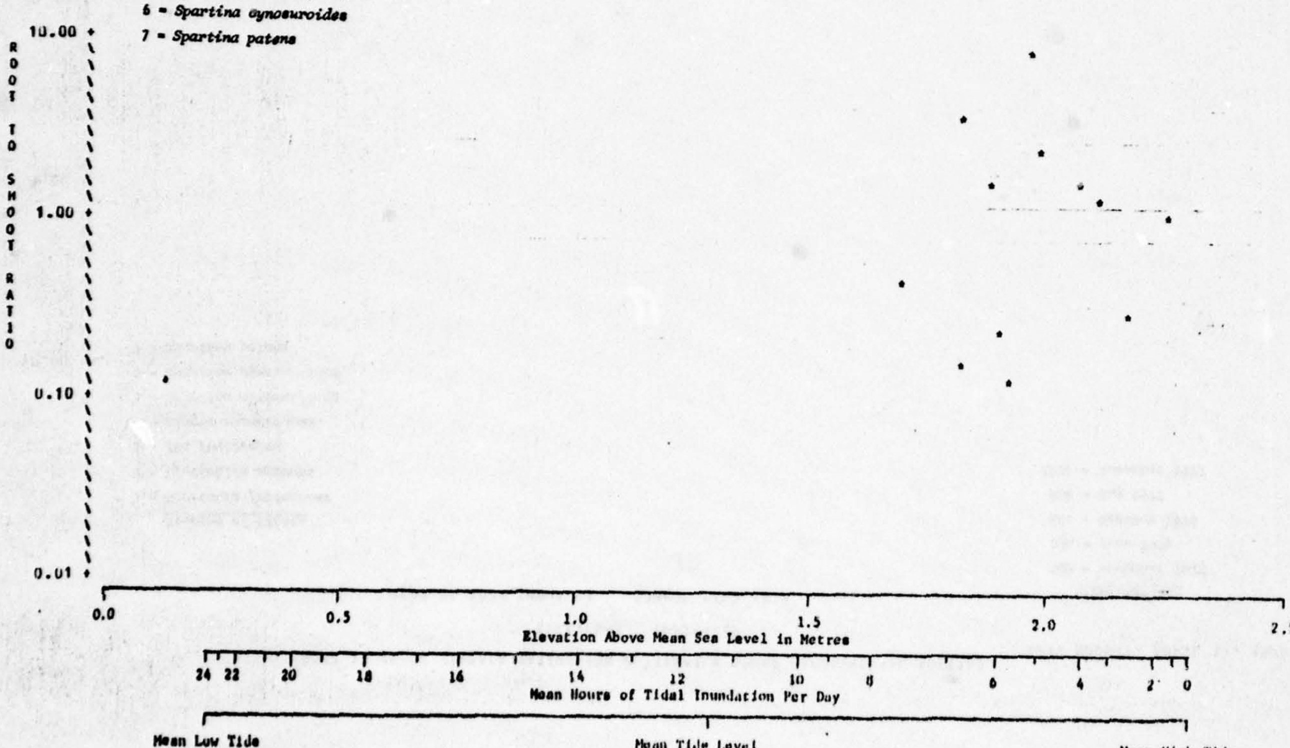
PLOT OF ROOT_SHO*ELEV SYMBOL USED IS *

Sampling Date

309 = November 1975
534 = June 1976
646 = October 1976
869 = May 1977
1036 = November 1977

Species of Plants

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*



Note: Maximum Spring Tide = 2.7 Metres

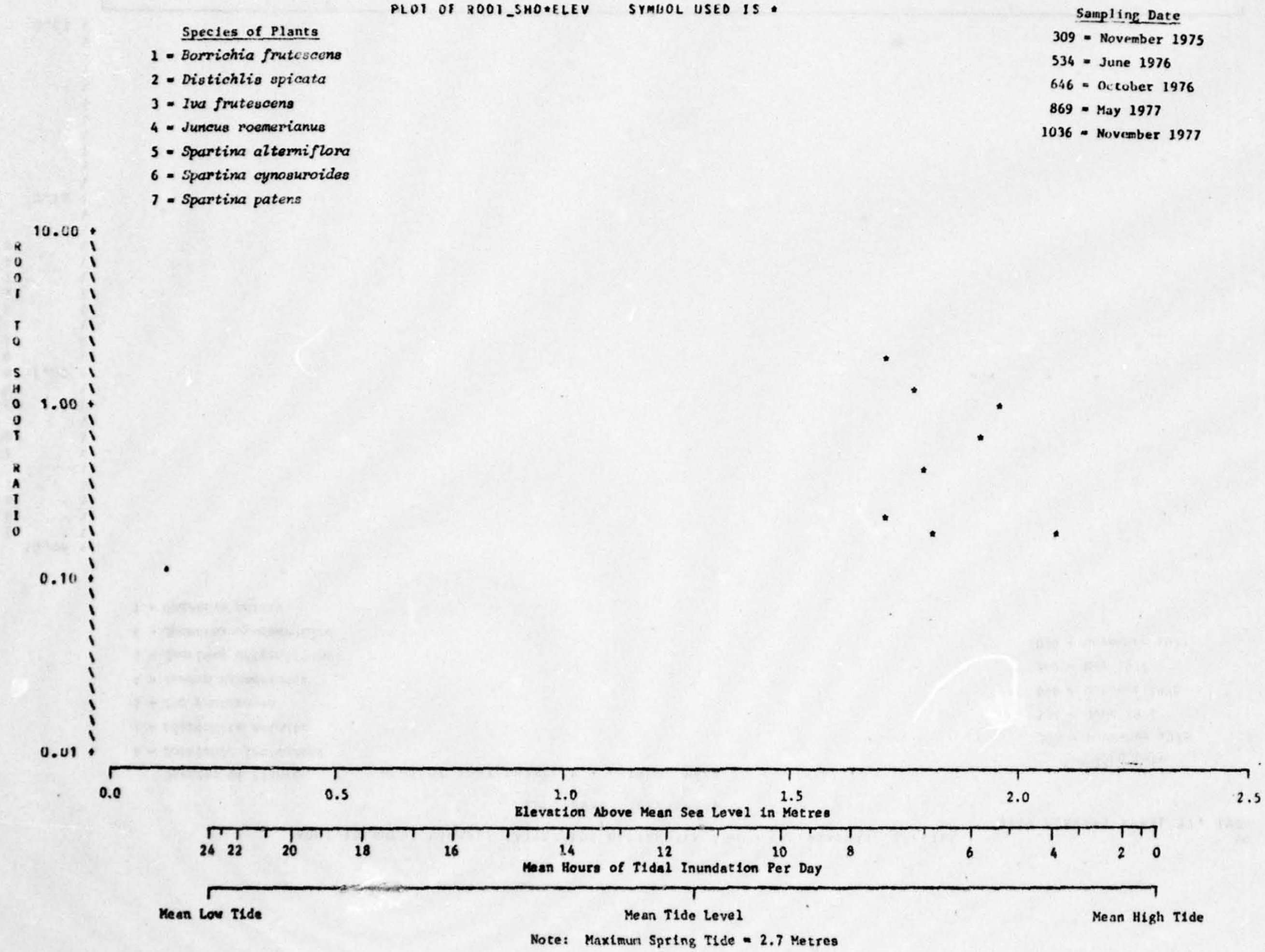
E16

ROOT TO SHOOT BIOMASS RATIOS FOR BUTTERMILK SOUND EXPERIMENTAL SPECIES 38

9:19 MONDAY, APRIL 17, 1978

SPECIES=4 CDATE=309

PLOT OF ROOT_SHO*ELEV SYMBOL USED IS *



E17

ROOT TO SHOOT BIOMASS RATIOS FOR BUTTERMILK SOUND EXPERIMENTAL SPECIES

9:19 MONDAY, APRIL 17, 1978

SPECIES=4 CDATE=646

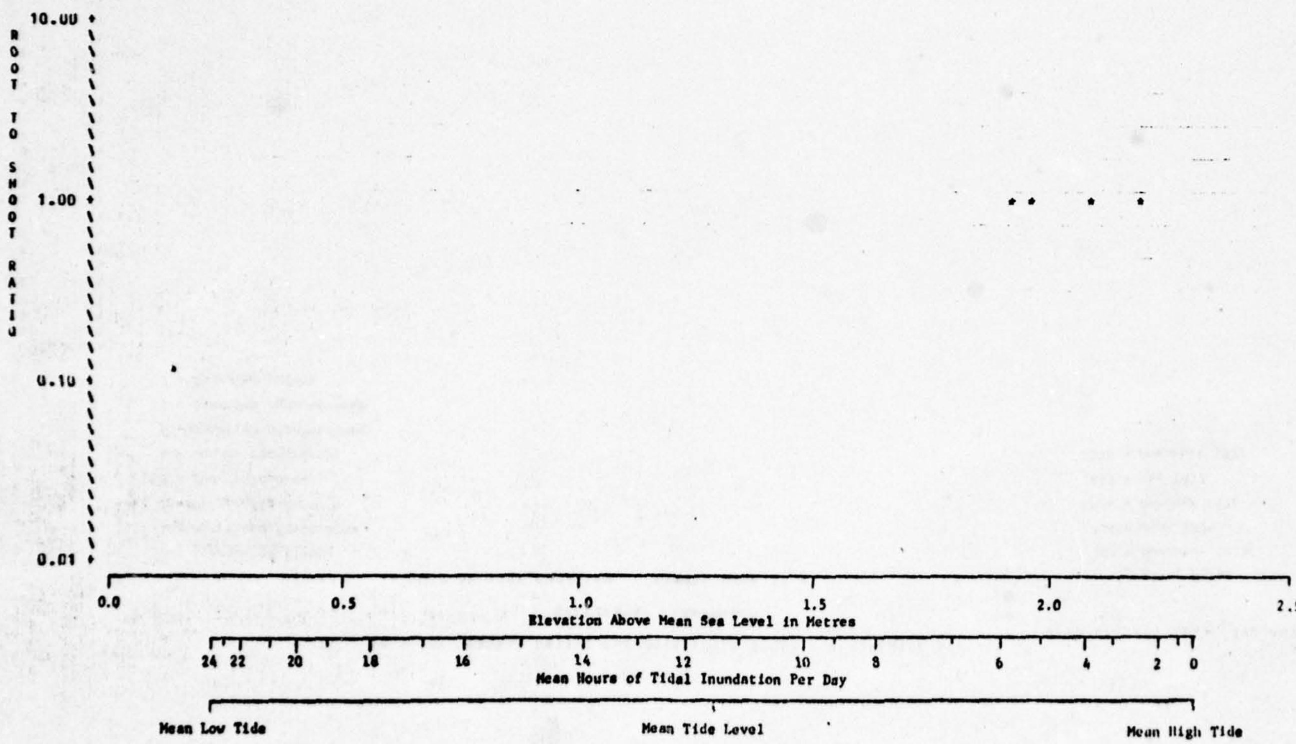
PLOT OF ROOT_SHO*ELEV SYMBOL USED IS *

Species of Plants

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*

Sampling Date

309 = November 1975
534 = June 1976
646 = October 1976
869 = May 1977
1036 = November 1977



Note: Maximum Spring Tide = 2.7 Metres

ROOT TO SHOOT BIOMASS RATIOS FOR BUTTERMILK SOUND EXPERIMENTAL SPECIES 40

9:19 MONDAY, APRIL 17, 1978

SPECIES=4 CDATE=869

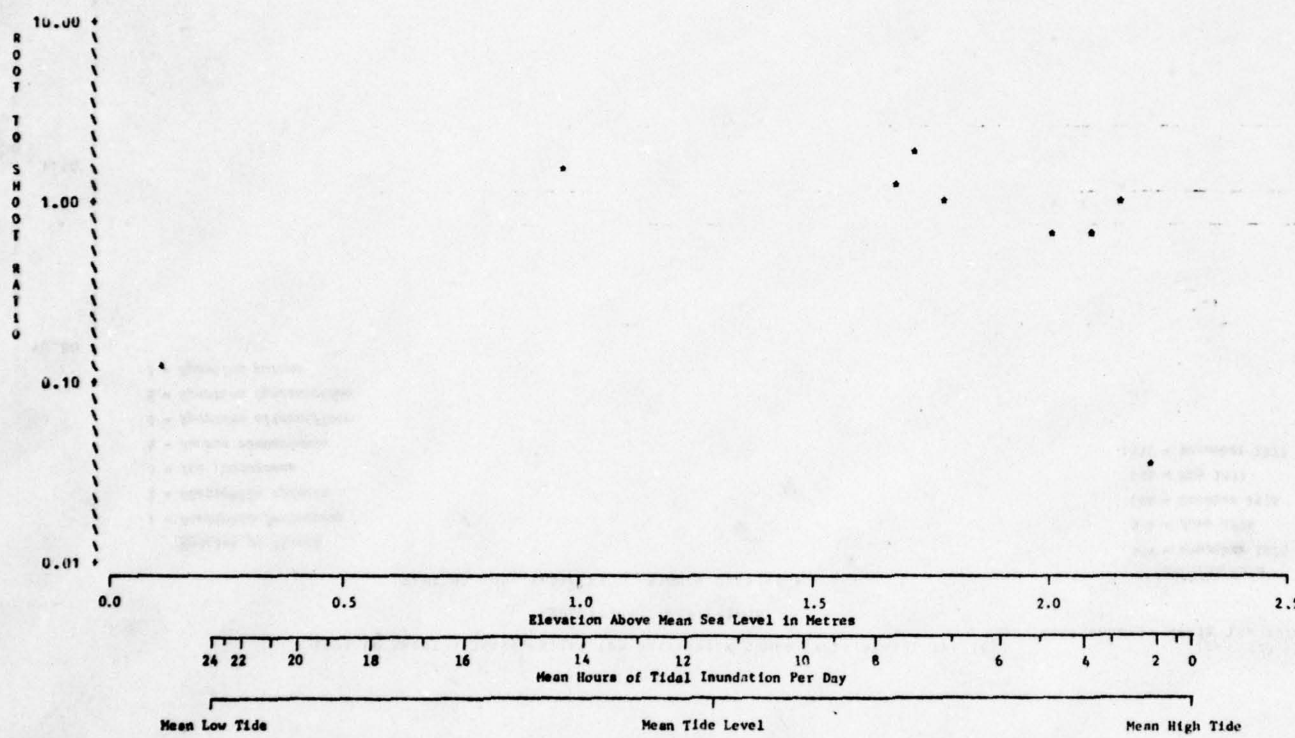
PLOT OF ROOT_SHO*ELEV SYMBOL USED IS *

Species of Plants

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*

Sampling Date

309 = November 1975
534 = June 1976
646 = October 1976
869 = May 1977
1036 = November 1977



Note: Maximum Spring Tide = 2.7 Metres

ROOT TO SHOOT BIOMASS RATIOS FOR BUTTERMILK SOUND EXPERIMENTAL SPECIES

9:19 MONDAY, APRIL 17, 1978

SPECIES=4 CDATE=1036

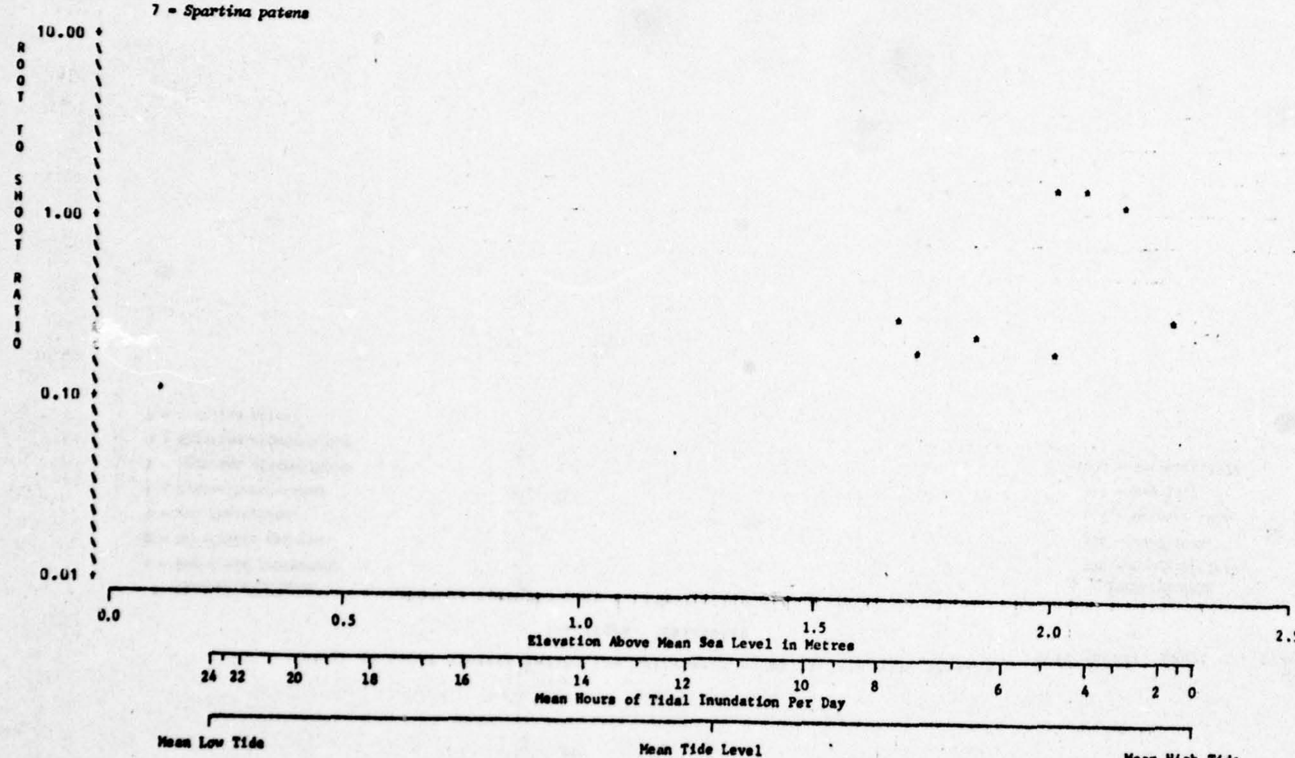
PLOT OF ROOT_SHO*ELEV SYMBOL USED IS *

Species of Plants

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*

Sampling Date

309 = November 1975
534 = June 1976
646 = October 1976
869 = May 1977
1036 = November 1977



Note: Maximum Spring Tide = 2.7 Metres

ROOT TO SHOOT BIOMASS RATIOS FOR BUTTERMILK SOUND EXPERIMENTAL SPECIES 9:19 MONDAY, APRIL 17, 1978 42

SPECIES=5 CDATE=309

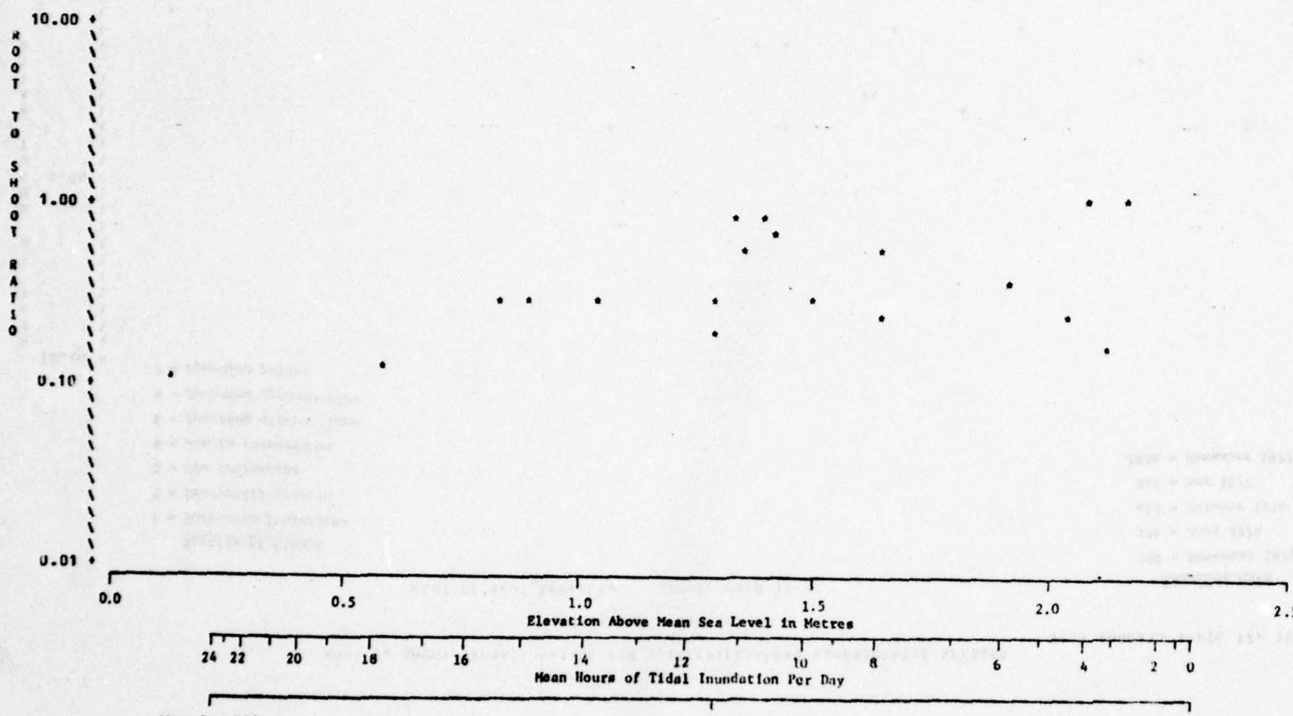
PLOT OF ROOT_SHO*ELEV SYMBOL USED IS *

Species of Plants

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*

Sampling Date

309 = November 1975
534 = June 1976
646 = October 1976
869 = May 1977
1036 = November 1977

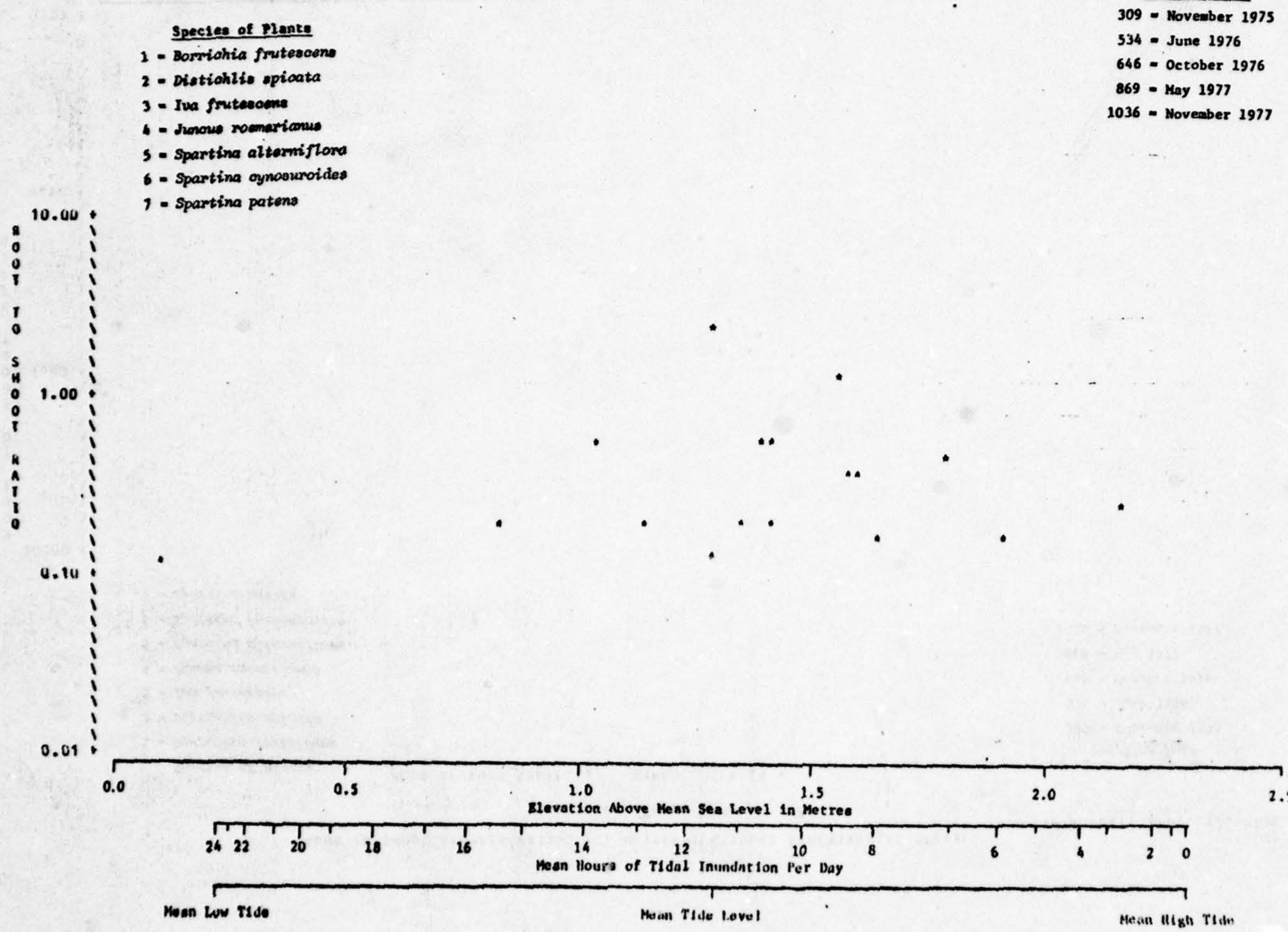


Note: Maximum Spring Tide = 2.7 Metres

ROOT TO SHOOT BIOMASS RATIOS FOR BUTTERMILK SOUND EXPERIMENTAL SPECIES

SPECIES=5 CDATE=534

PLOT OF ROOT_SHO*ELEV SYMBOL USED IS *



Note: Maximum Spring Tide = 2.7 Metres

ROOT TO SHOOT BIOMASS RATIOS FOR BUTTERMILK SOUND EXPERIMENTAL SPECIES

9:19 MONDAY, APRIL 17, 1978

SPECIES=5 CDATE=646

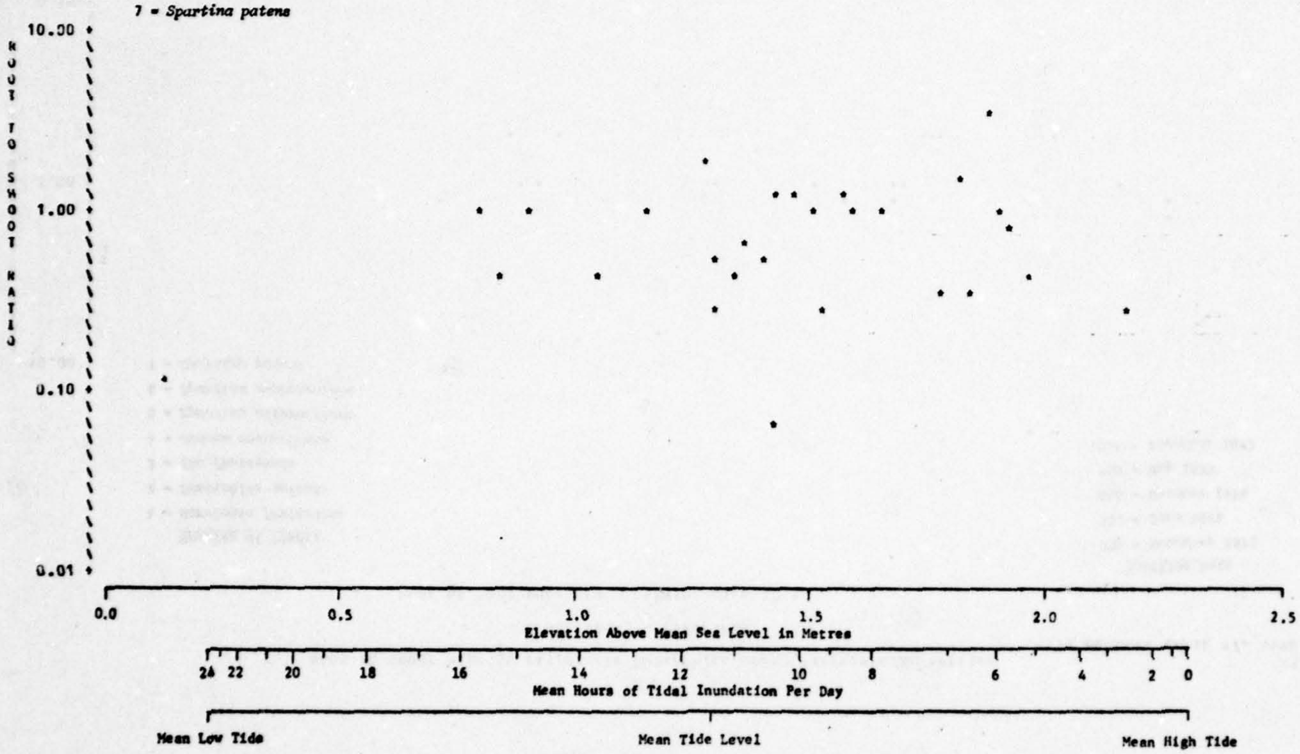
PLOT OF ROOT_SHO*ELEV SYMBOL USED IS *

Species of Plants

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*

Sampling Date

309 = November 1975
534 = June 1976
646 = October 1976
869 = May 1977
1036 = November 1977

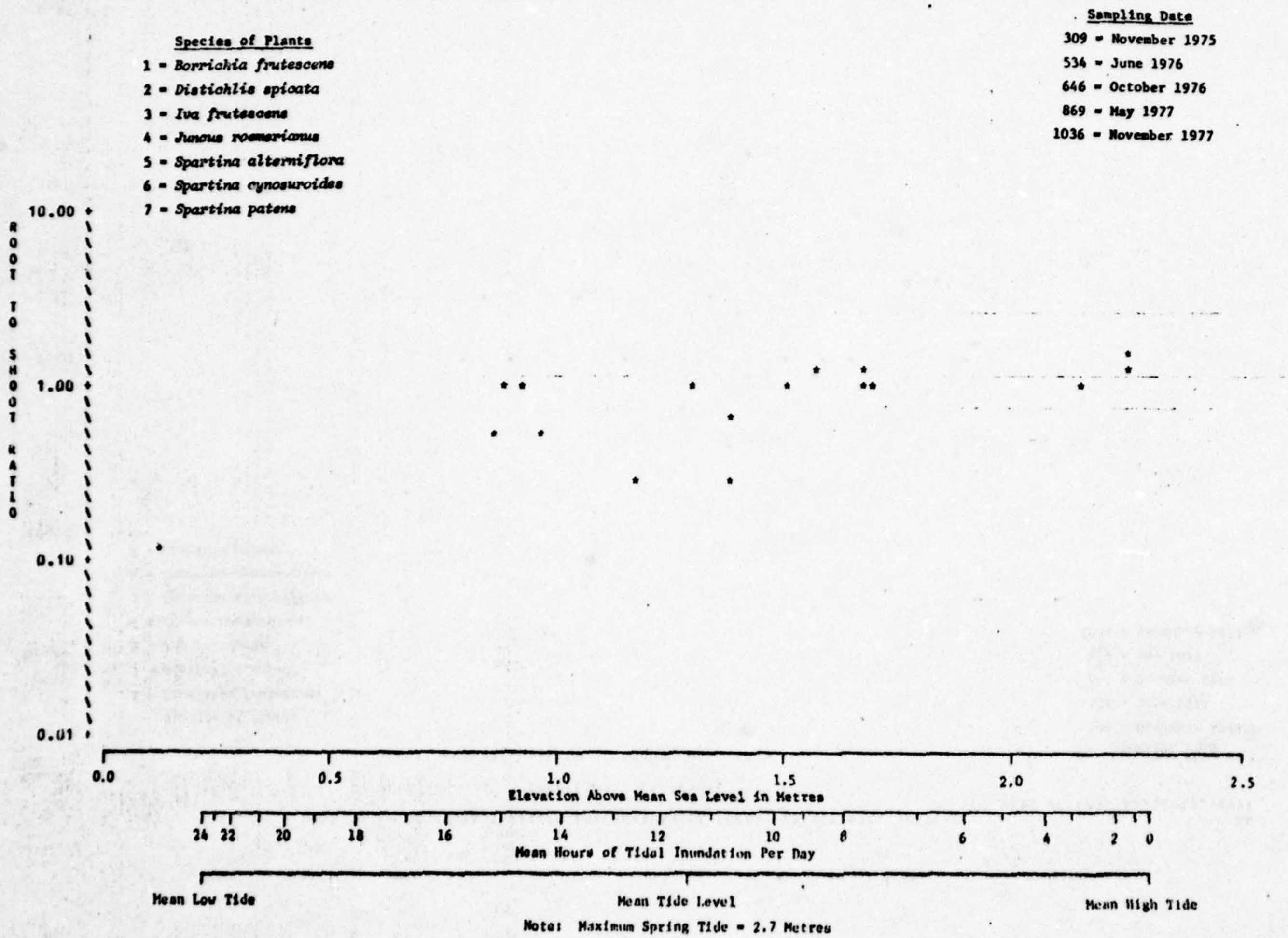


Note: Maximum Spring Tide = 2.7 Metres

ROOT TO SHOOT BIOMASS RATIOS FOR BUTTERMILK SOUND EXPERIMENTAL SPECIES 9:19 MONDAY, APRIL 17, 1978 45

SPECIES=5 CDATE=869

PLOT OF ROOT_SHO*ELEV SYMBOL USED IS *



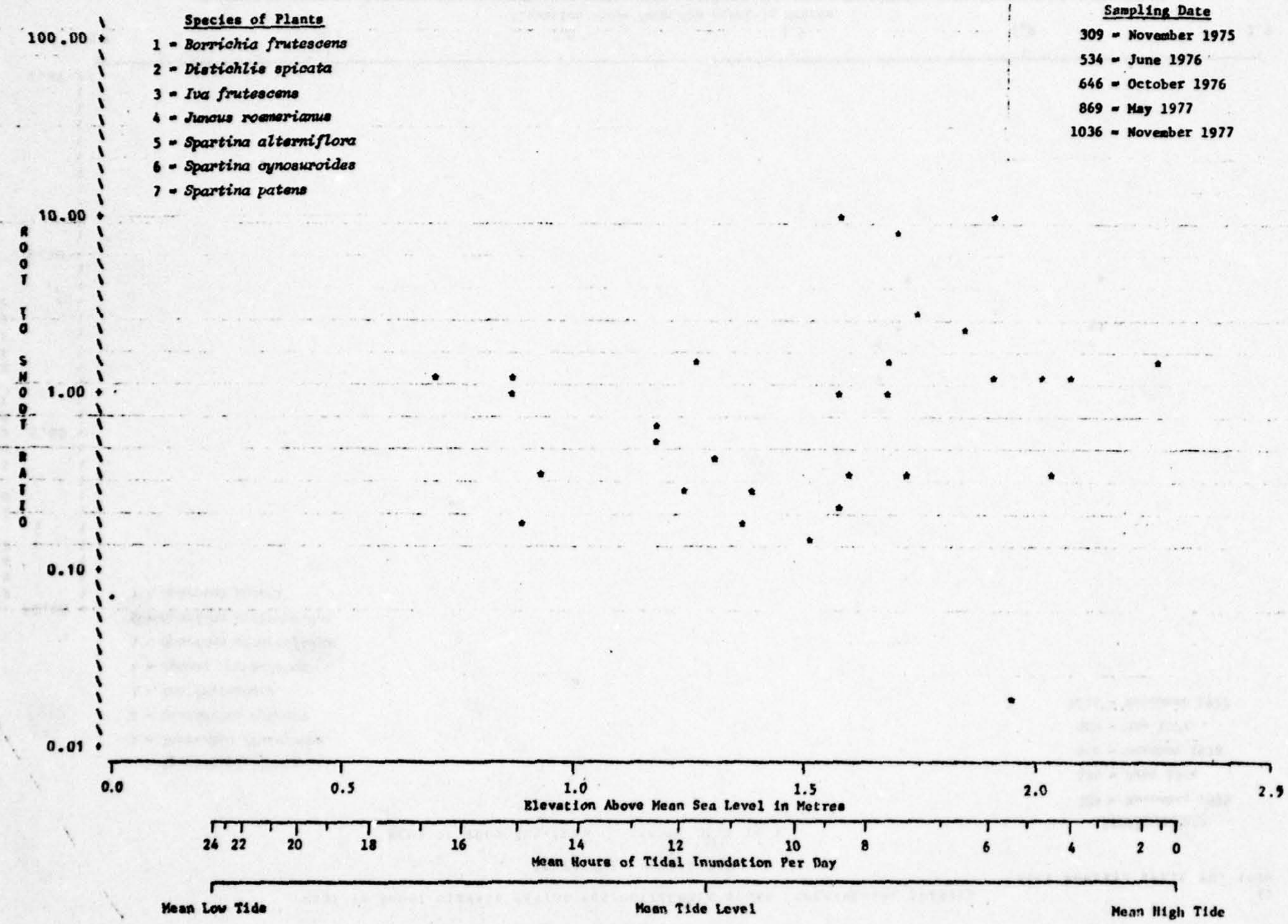
E24

ROOT TO SHOOT BIOMASS RATIOS FOR BUTTERMILK SOUND EXPERIMENTAL SPECIES 46

9:19 MONDAY, APRIL 17, 1978

SPECIES=5 CDATE=1036

PLOT OF ROOT_SHO*ELEV SYMBOL USED IS *

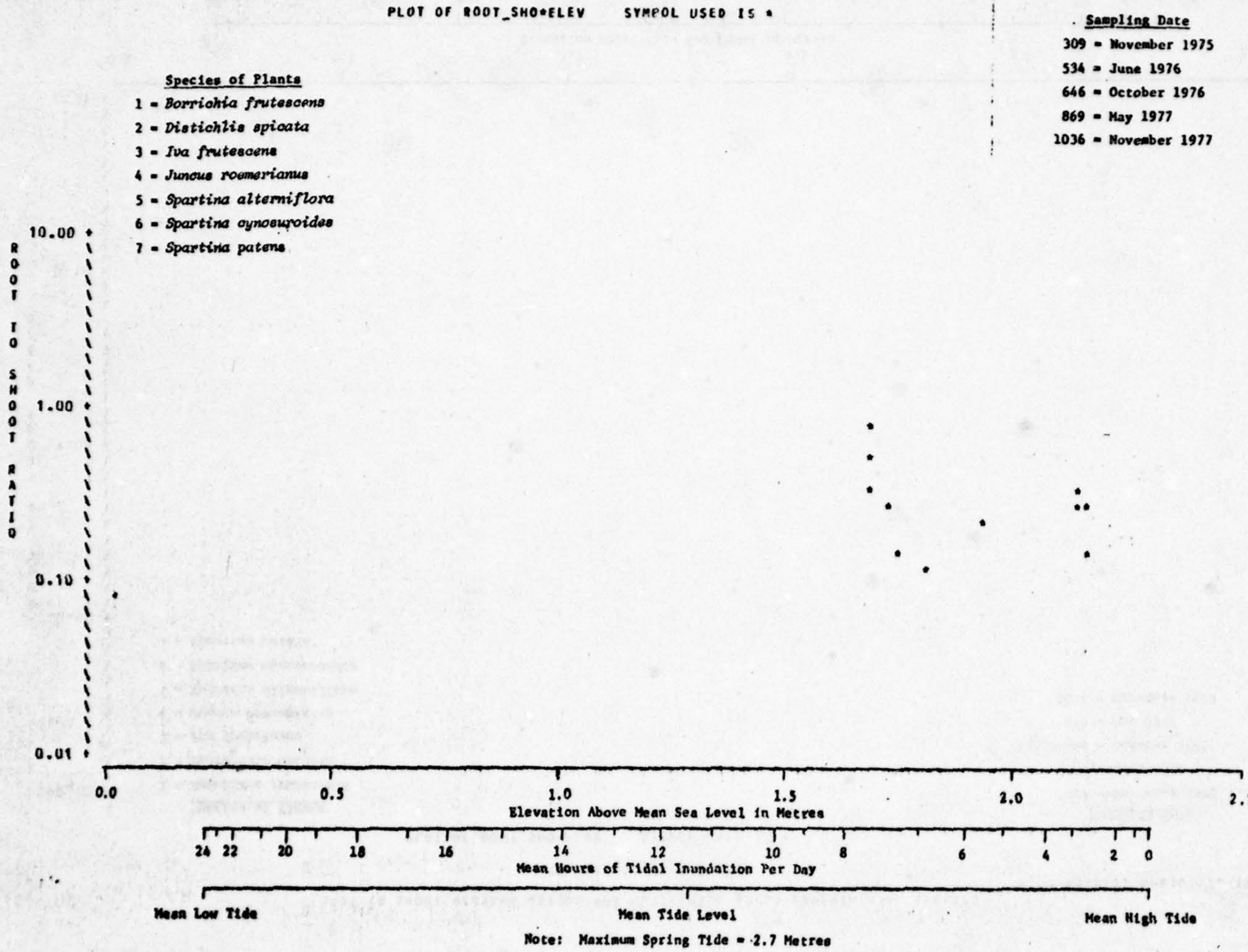


Note: Maximum Spring Tide = 2.7 Metres

ROOT TO SHOOT BIOMASS RATIOS FOR BUTTERMILK SOUND EXPERIMENTAL SPECIES

SPECIES=6 CDATE=309

PLOT OF ROOT_SHO*ELEV SYMBOL USED IS *

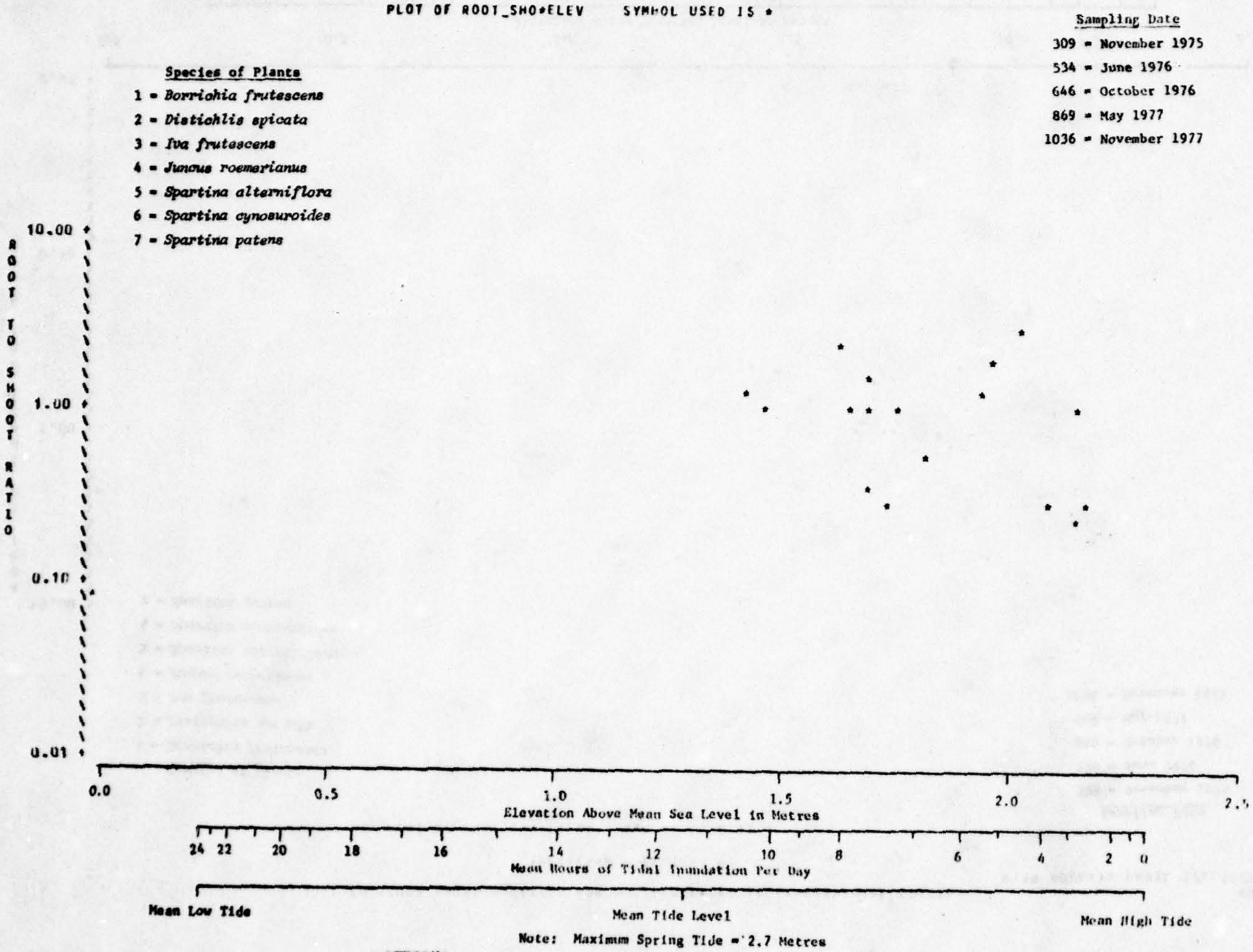


ROOT TO SHOOT BIOMASS RATIOS FOR BUTTERMILK SOUND EXPERIMENTAL SPECIES

9:19 MONDAY, APRIL 17, 1978 48

SPECIES=6 CDATE=646

PLOT OF ROOT_SHO*ELEV SYMBOL USED IS *



ROOT TO SHOOT BIOMASS RATIOS FOR BUTTERMILK SOUND EXPERIMENTAL SPECIES 49

9:19 MONDAY, APRIL 17, 1978

SPECIES=6 CDATE=869

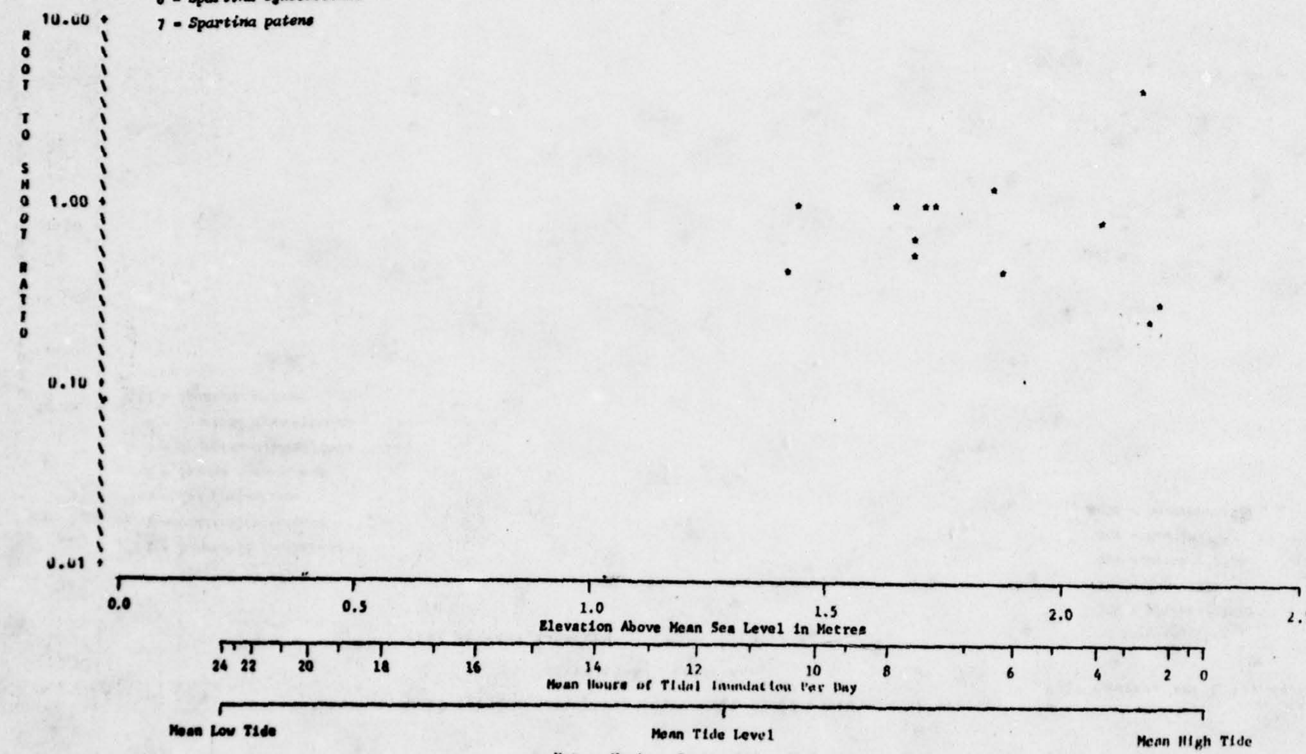
PLOT OF ROOT_SHO*ELEV SYMBOL USED IS *

Species of Plants

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*

Sampling Date

309 = November 1975
534 = June 1976
646 = October 1976
869 = May 1977
1036 = November 1977

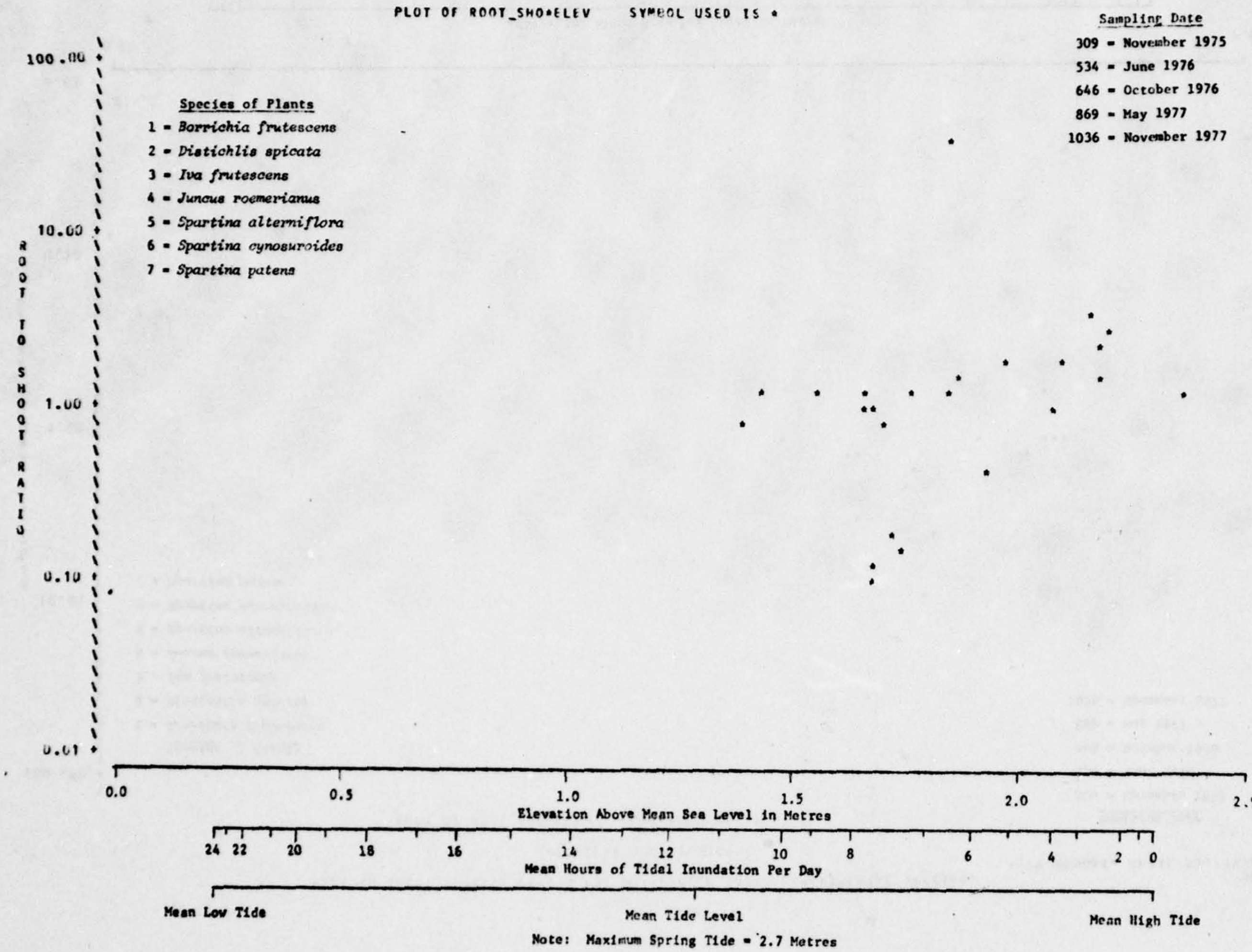


Note: Maximum Spring Tide = 2.7 Metres

E28

ROOT TO SHOOT BIOMASS RATIOS FOR BUTTERMILK SOUND EXPERIMENTAL SPECIES

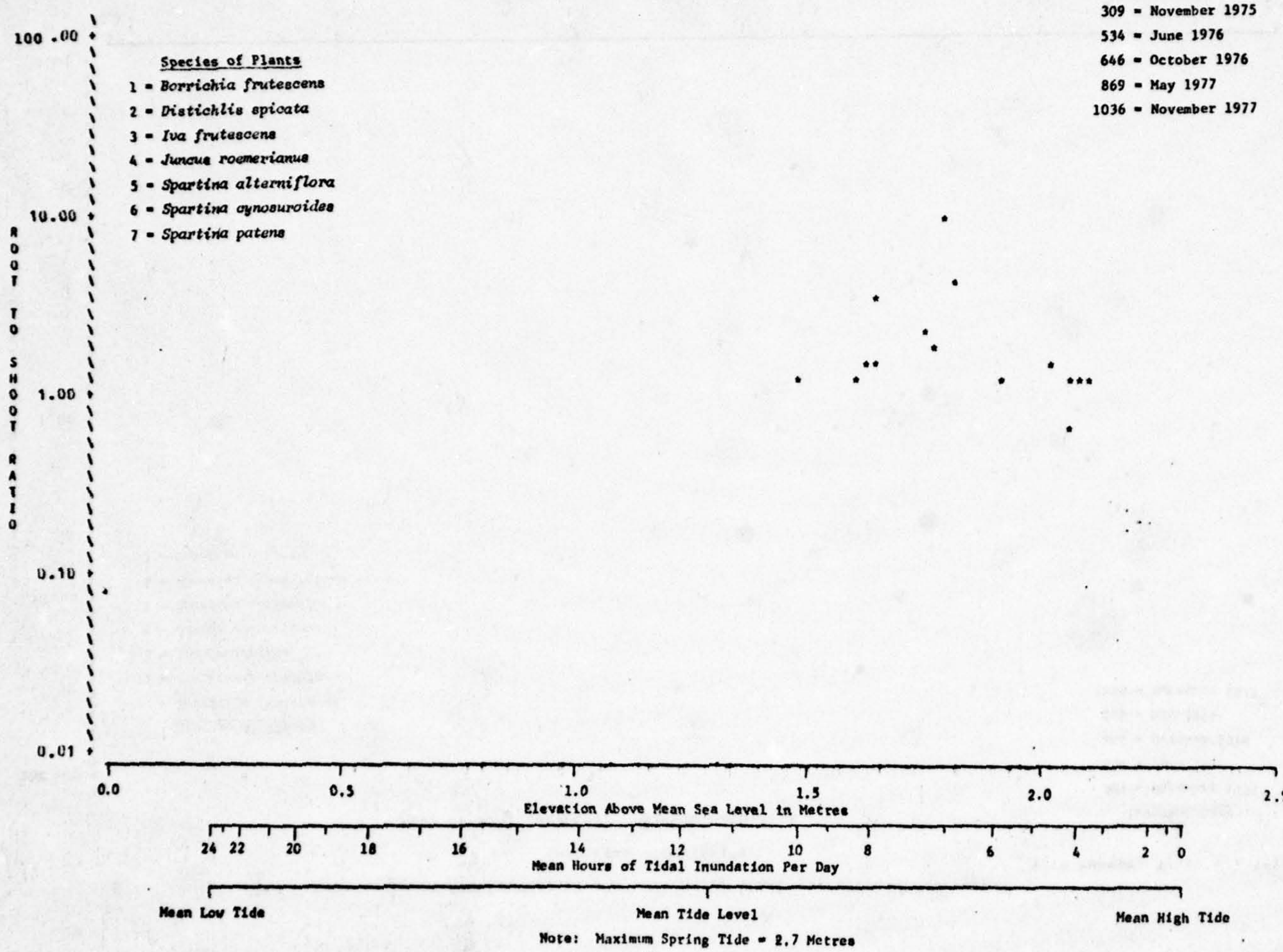
SPECIES=6 CDATE=1036



ROOT TO SHOOT BIOMASS RATIOS FOR BUTTERMILK SOUND EXPERIMENTAL SPECIES 9:19 MONDAY, APRIL 17, 1978 51

SPECIES=7 CDATE=309

PLOT OF ROOT_SHO*ELEV SYMBOL USED IS *



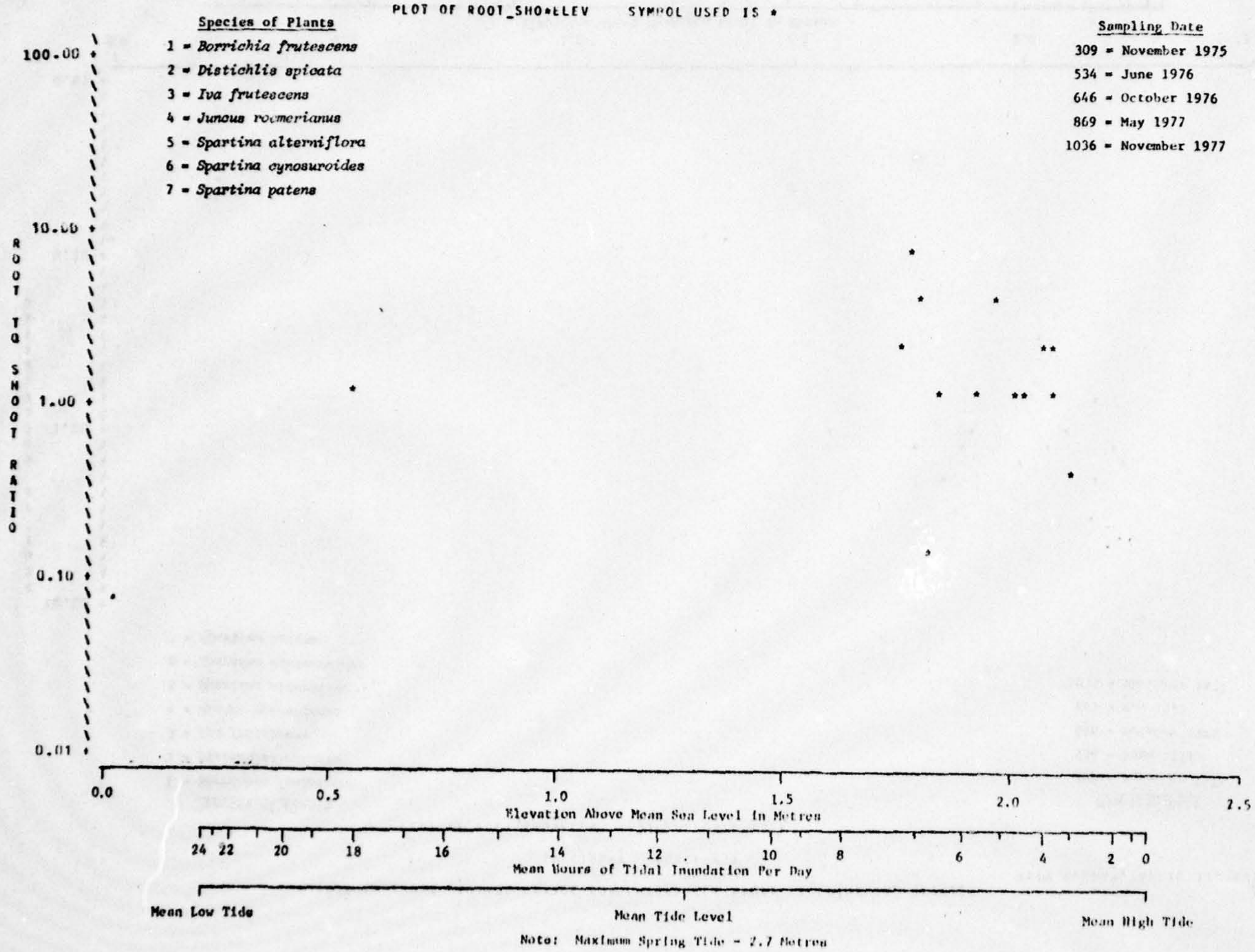
E30

ROOT TO SHOOT BIOMASS RATIOS FOR BUTTERMILK SOUND EXPERIMENTAL SPECIES

9:19 MONDAY, APRIL 17, 1978

SPECIES=7 CDATE=646

PLOT OF ROOT_SHO*ELEV SYMBOL USED IS *



ROOT TO SHOOT BIOMASS RATIOS FOR BUTTERMILK SOUND EXPERIMENTAL SPECIES 53

9:19 MONDAY, APRIL 17, 1978

SPECIES=7 CDATE=869

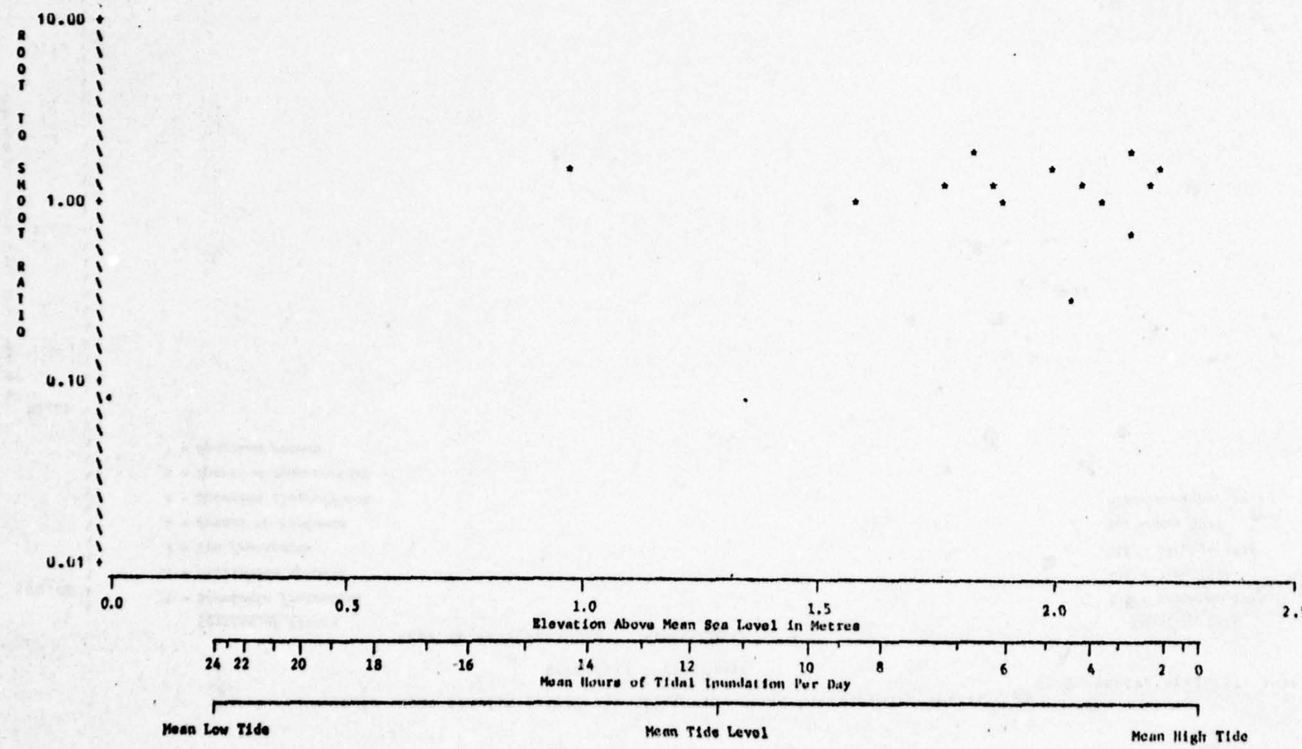
PLOT OF ROOT_SHO*ELEV SYMBOL USED IS *

Species of Plants

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*

Sampling Date

309 = November 1975
534 = June 1976
646 = October 1976
869 = May 1977
1036 = November 1977



Note: Maximum Spring Tide = 2.7 Metres

ROOT TO SHOOT BIOMASS RATIOS FOR BUTTERMILK SOUND EXPERIMENTAL SPECIES

9:19 MONDAY, APRIL 17, 1978

SPECIES=7 CDATE=1036

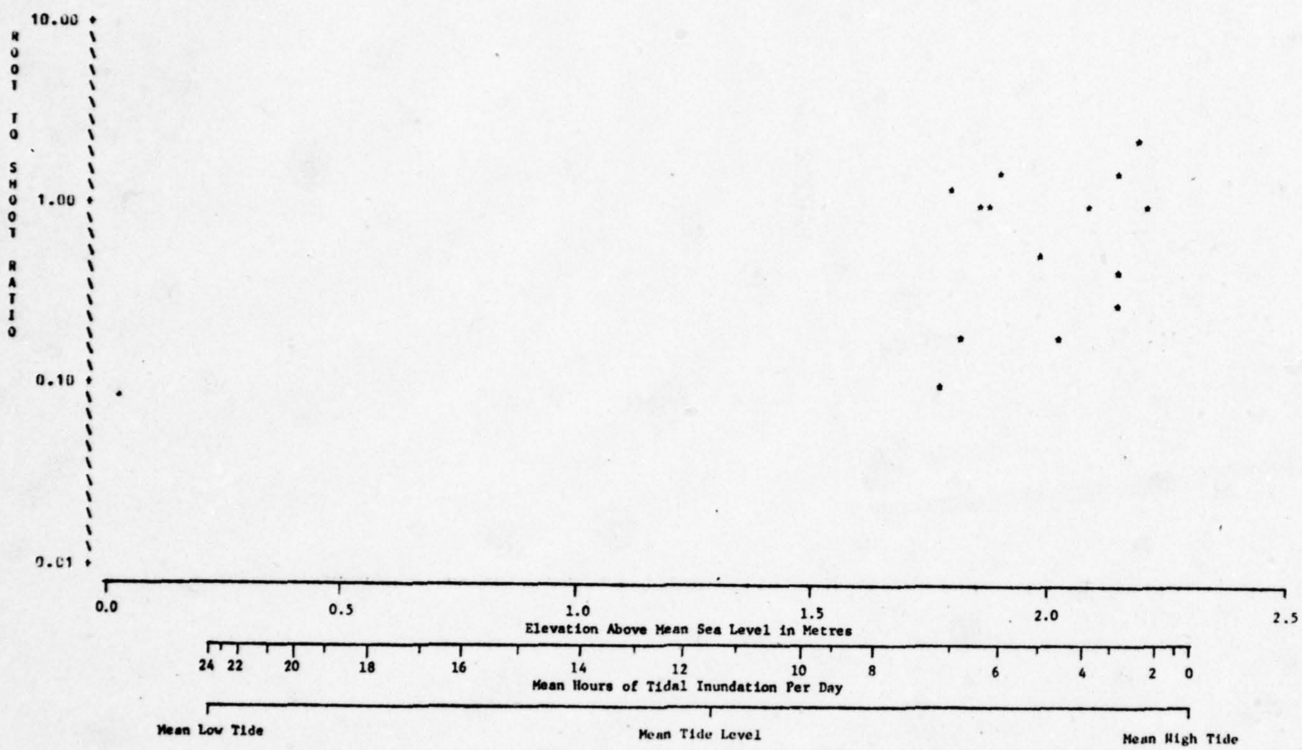
PLOT OF ROOT_SHO*ELEV SYMBOL USED IS *

Species of Plants

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*

Sampling Date

309 = November 1975
534 = June 1976
646 = October 1976
869 = May 1977
1036 = November 1977

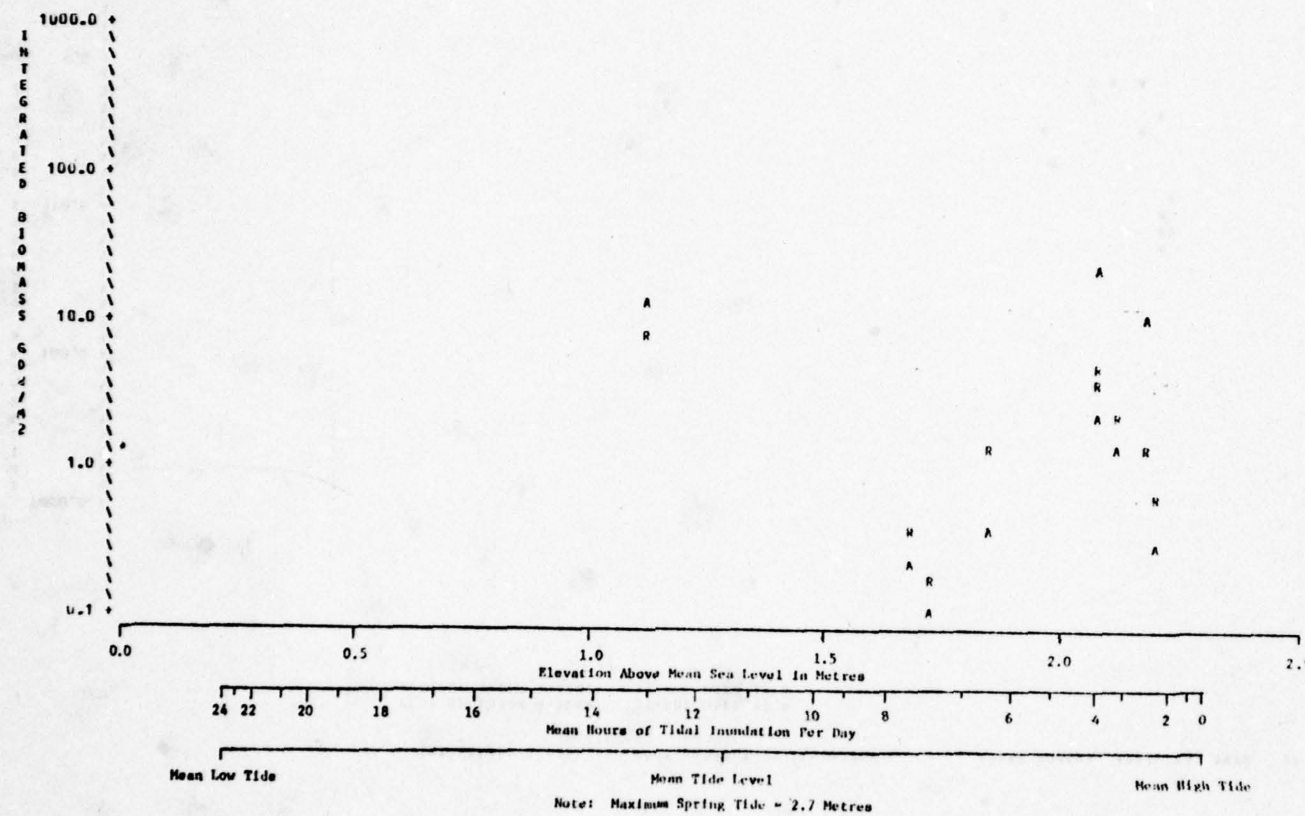


Note: Maximum Spring Tide = 2.7 Metres

PART 2

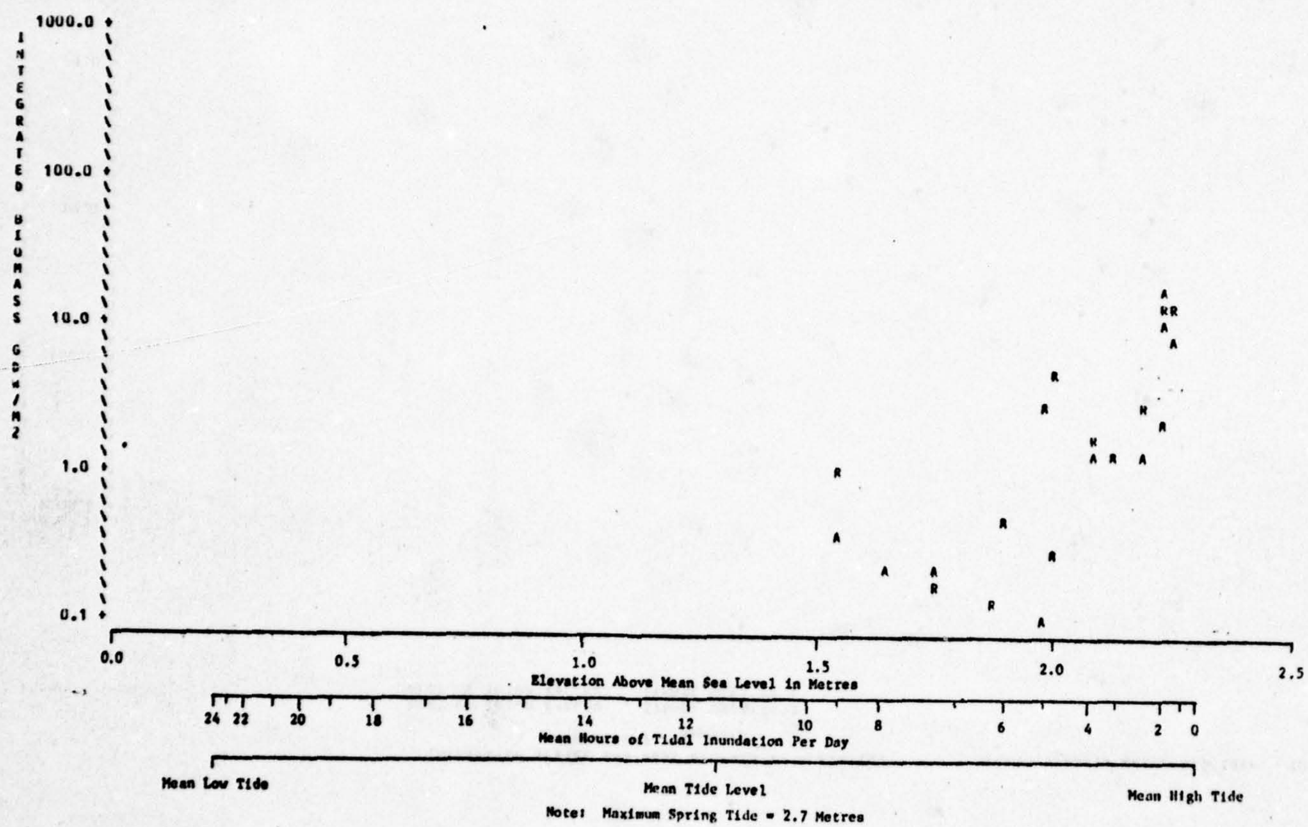
INTEGRATED AERIAL AND ROOT BIOMASS VS ELEVATION 23:10 MONDAY, APRIL 17, 1978 10
SPECIES=1 May 1977

PLOT OF IBIOM_R*ELEV SYMBOL USED IS R
PLOT OF IBIOM_A*ELEV SYMBOL USED IS A



INTEGRATED AERIAL AND ROOT BIOMASS VS ELEVATION 23:10 MONDAY, APRIL 17, 1978 12
SPECIES=2 May 1977

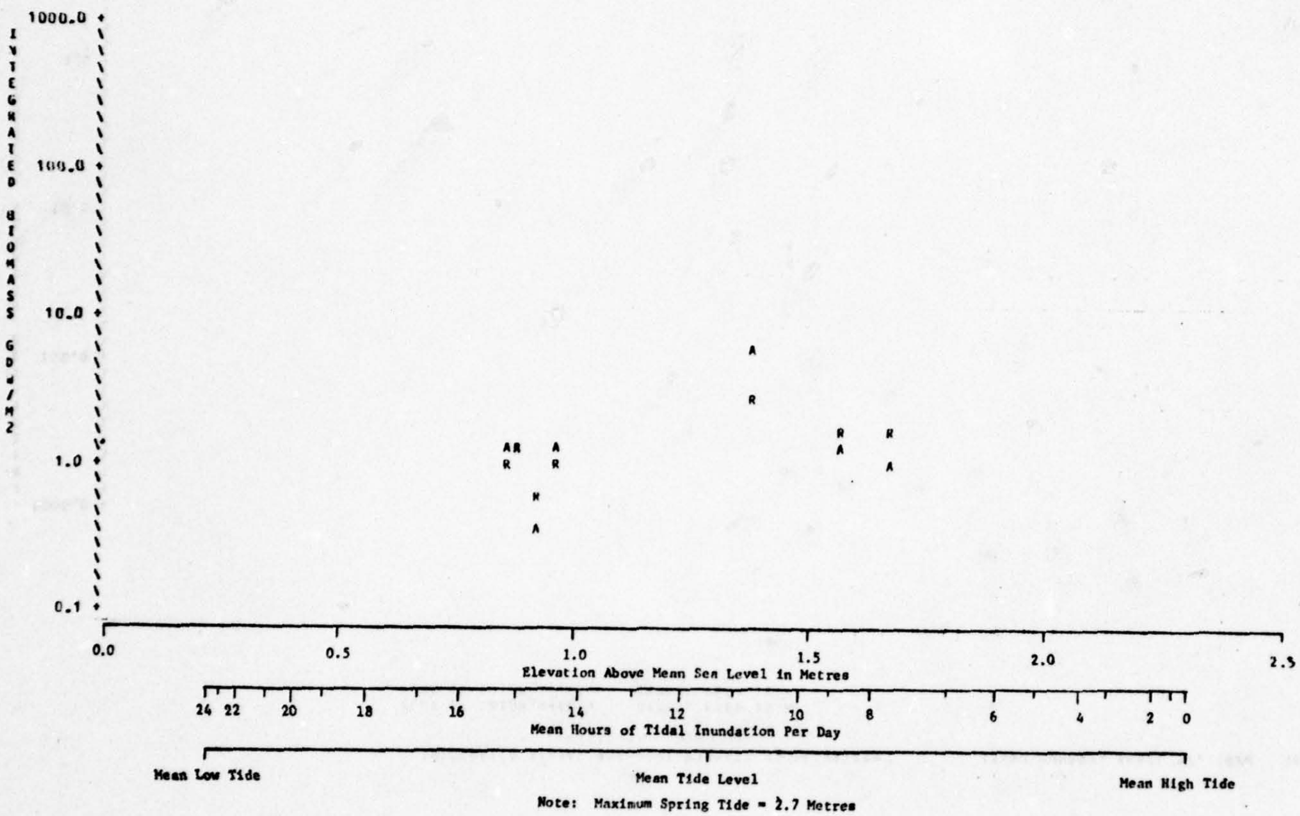
PLOT OF IBIOM_R*ELEV SYMBOL USED IS R
PLOT OF IBIOM_A*ELEV SYMBOL USED IS A



E36

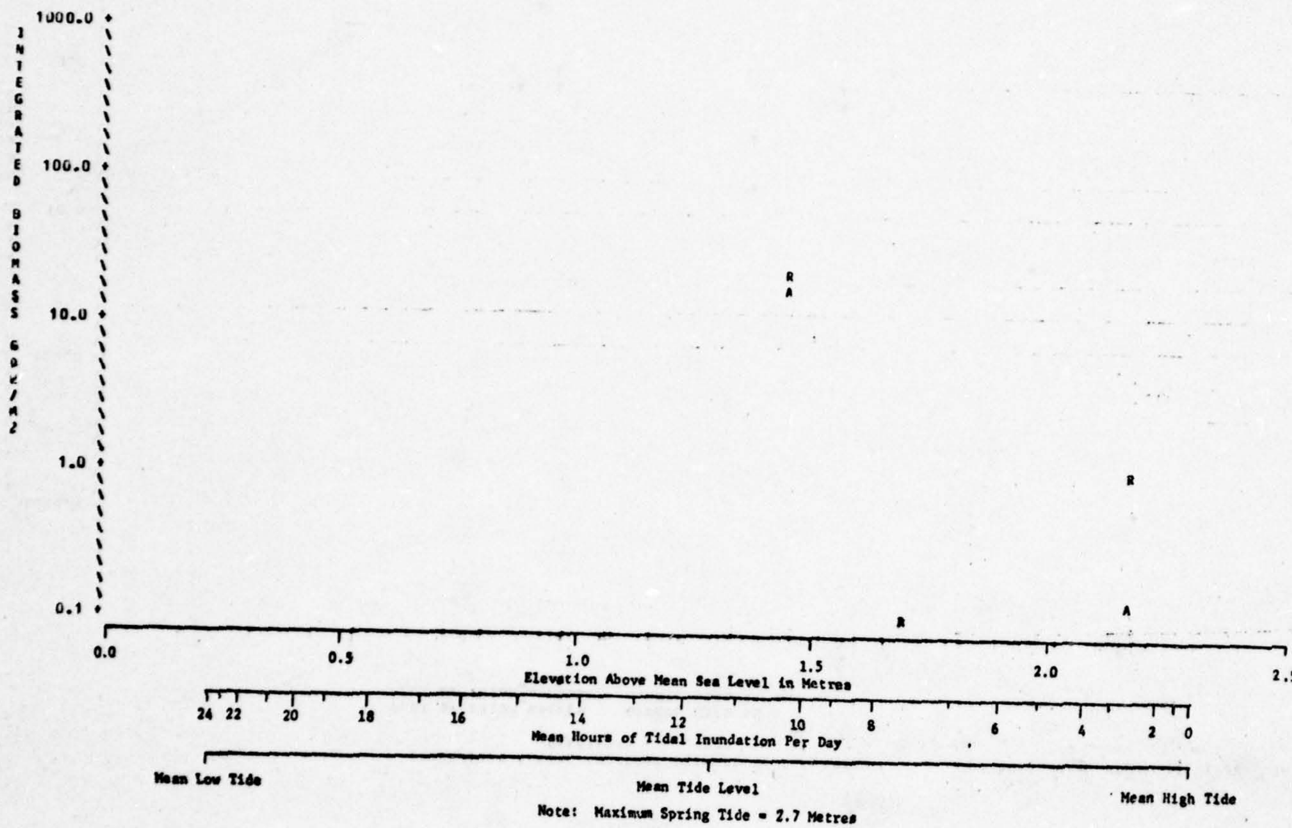
INTEGRATED AERIAL AND ROOT BIOMASS VS ELEVATION 23:10 MONDAY, APRIL 17, 1978 14
SPECIES=5 May 1977

PLOT OF IBIOM_R*ELEV SYMBOL USED IS R
PLOT OF IBIOM_A*ELEV SYMBOL USED IS A



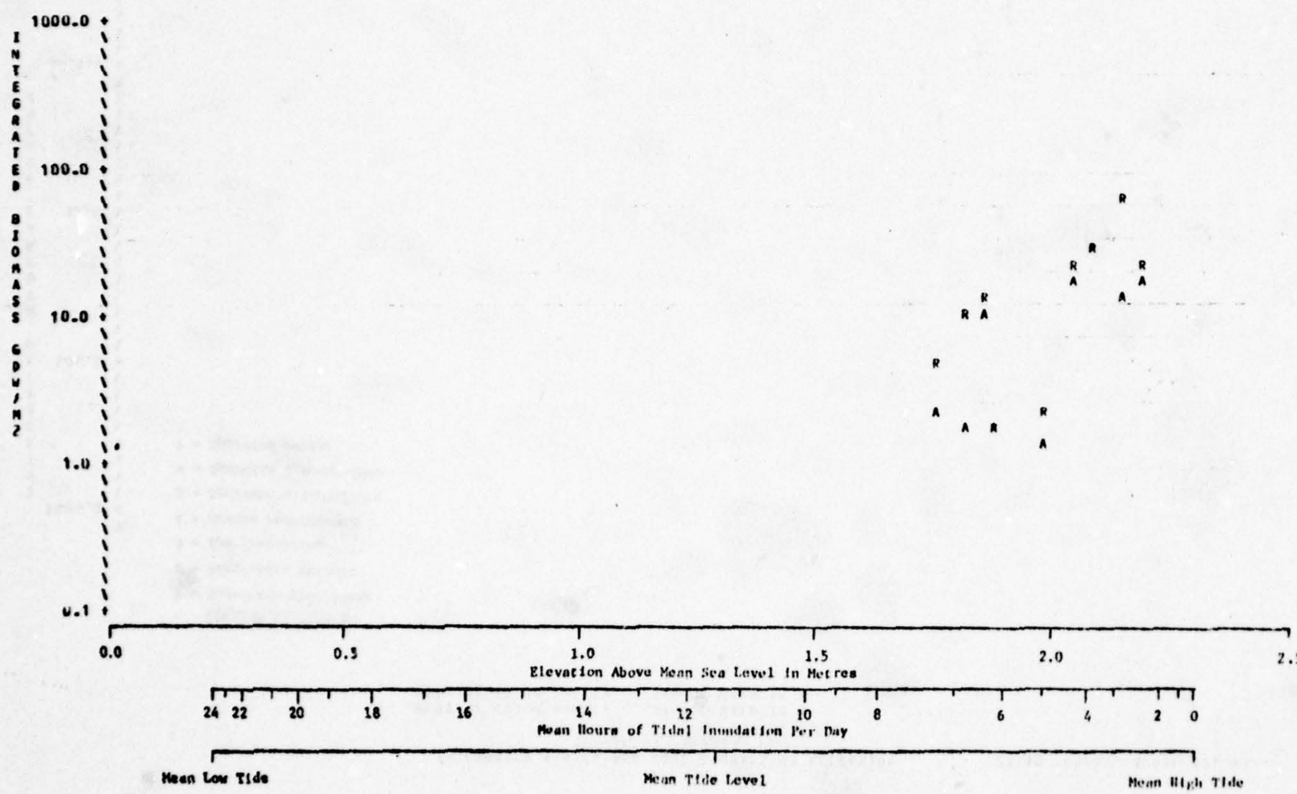
INTEGRATED AERIAL AND ROOT BIOMASS VS ELEVATION
SPECIES=6 May 1977

PLOT OF IBIOM_R*ELEV SYMBOL USED IS R
PLOT OF IBIOM_A*ELEV SYMBOL USED IS A



INTEGRATED AERIAL AND ROOT BIOMASS VS ELEVATION 23:10 MONDAY, APRIL 17, 1978 18
SPECIES=7 May 1977

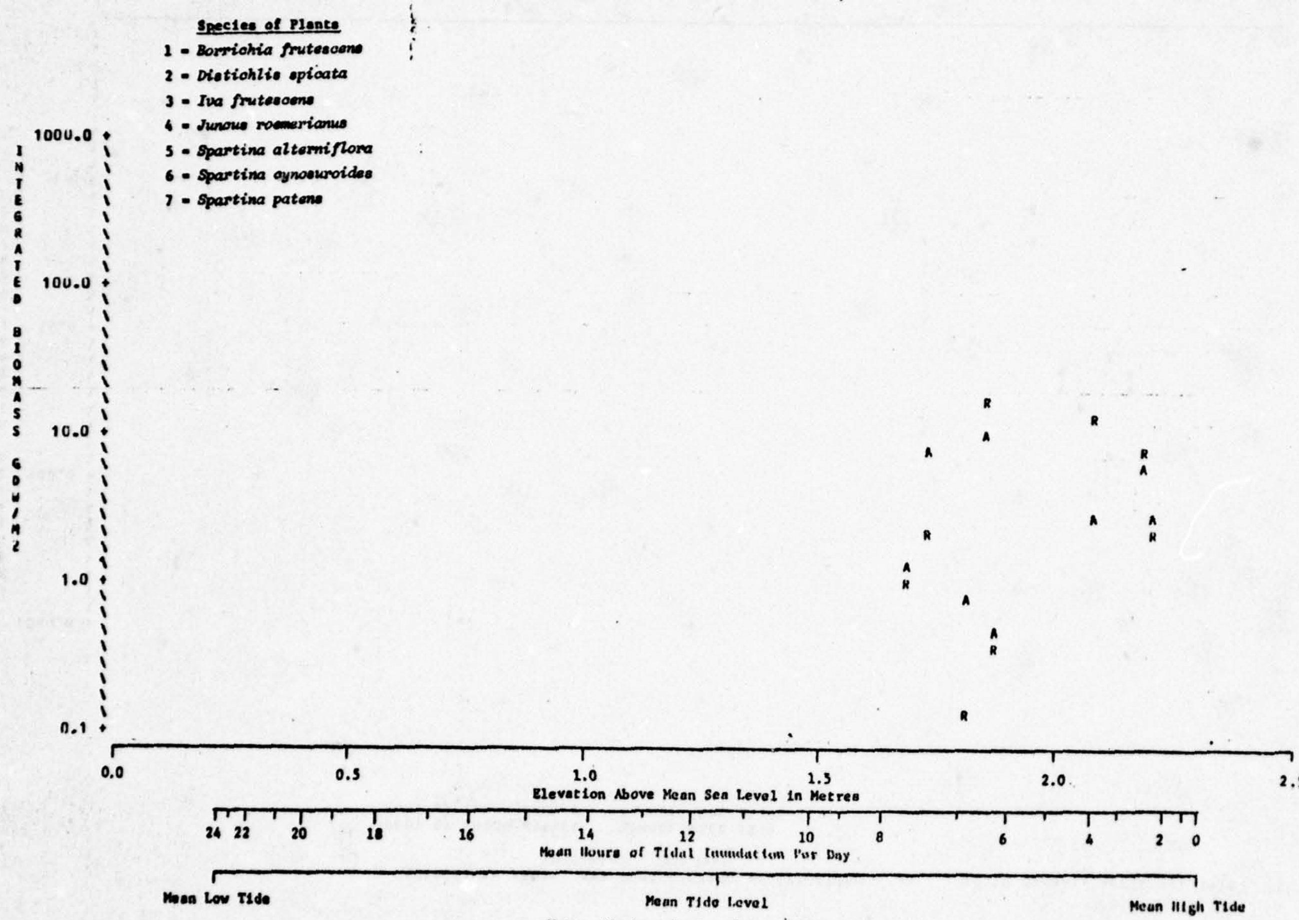
PLOT OF IBIOM_R*ELEV SYMBOL USED IS R
PLOT OF IBIOM_A*ELEV SYMBOL USED IS A



Note: Maximum Spring Tide = 2.7 Metres

INTEGRATED AERIAL AND ROOT BIOMASS VS ELEVATION 23:10 MONDAY, APRIL 17, 1978 11
SPECIES=1 November 1977

PLOT OF IBIOM_R*ELEV SYMBOL USED IS R
PLOT OF IBIOM_A*ELEV SYMBOL USED IS A



Note: Maximum Spring Tide = 2.7 Metres

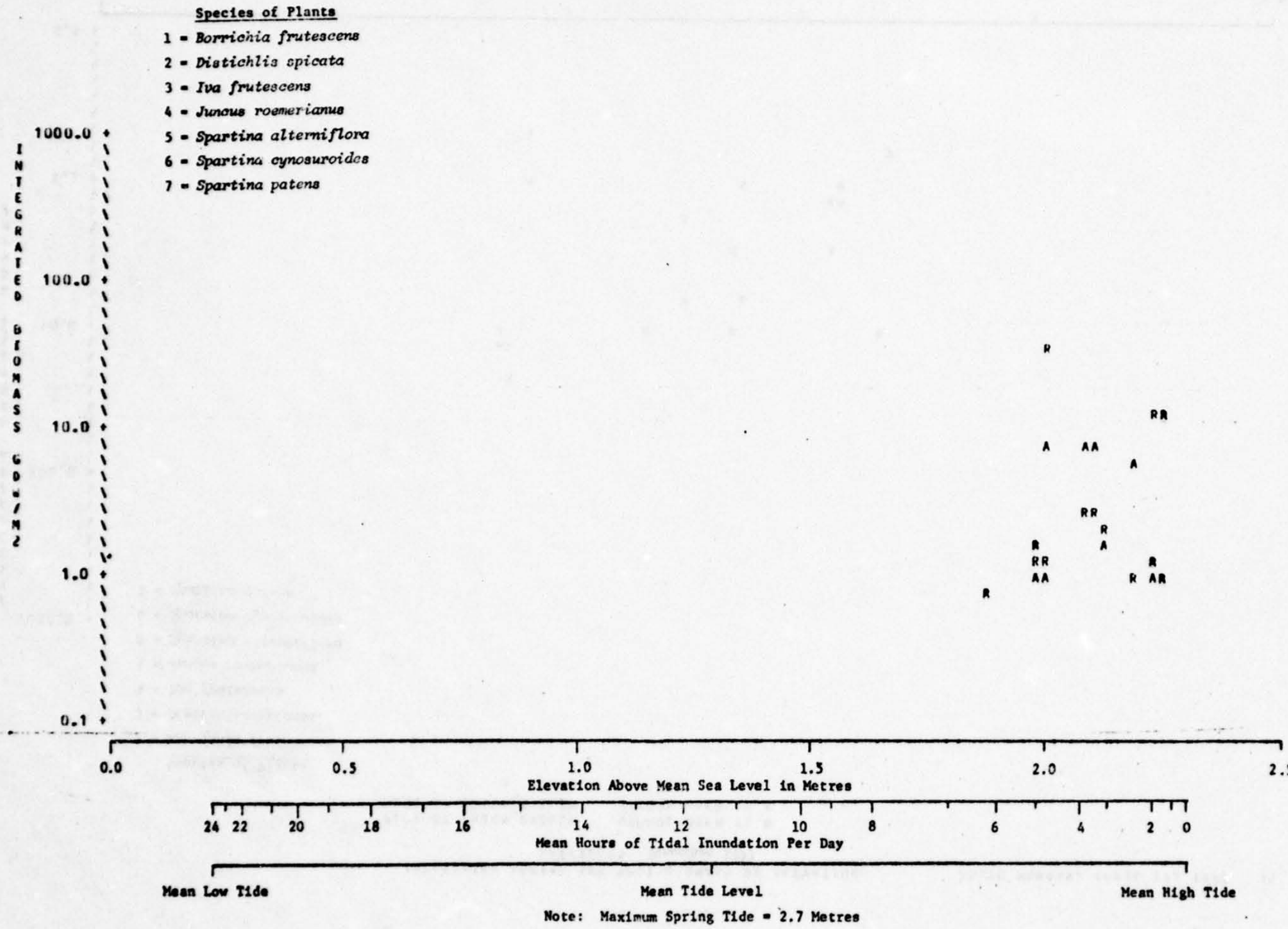
E40

INTEGRATED AERIAL AND ROOT BIOMASS VS ELEVATION   23:10 MONDAY, APRIL 17, 1978   13

SPECIES=2   November 1977

PLOT OF IBIOM_R*ELEV   SYMBOL USED IS R

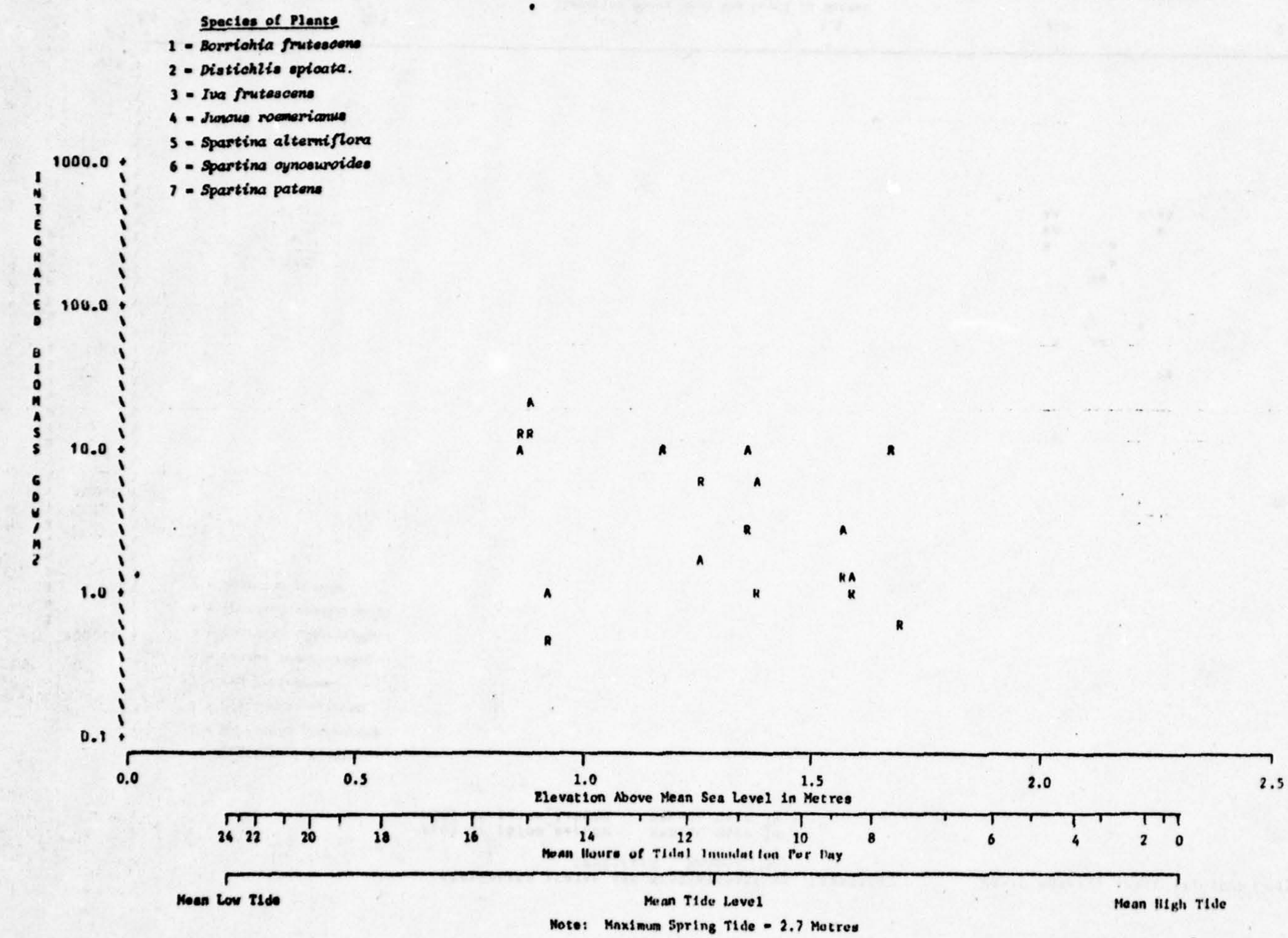
PLOT OF IBIOM_A*ELEV   SYMBOL USED IS A



E41

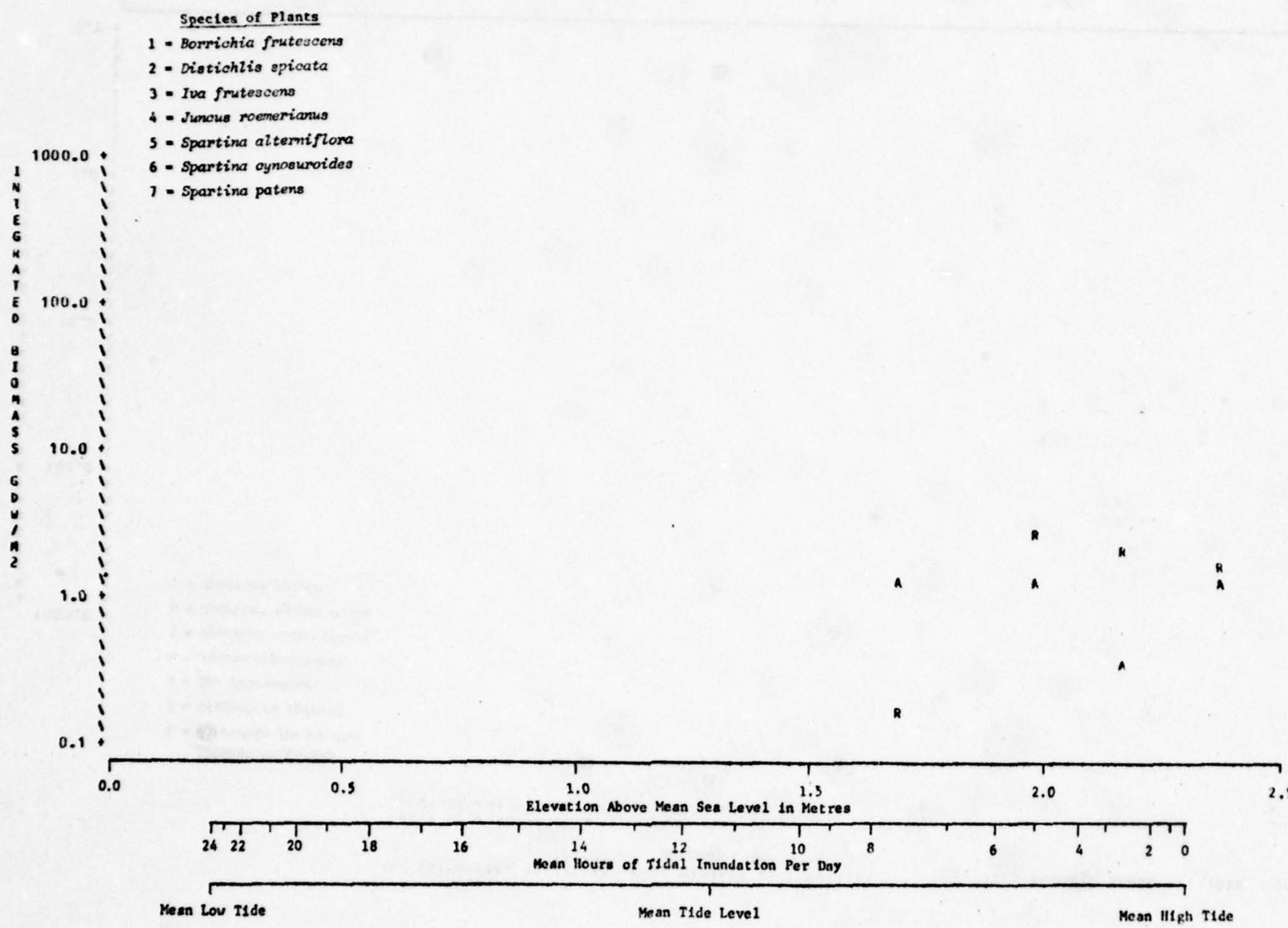
INTEGRATED AERIAL AND ROOT BIOMASS VS ELEVATION 23:10 MONDAY, APRIL 17, 1978 15
SPECIES=5 November 1977

PLOT OF IBIOM_R*ELEV SYMBOL USED IS R
PLOT OF IBIOM_A*ELEV SYMBOL USED IS A



INTEGRATED AERIAL AND ROOT BIOMASS VS ELEVATION 23:10 MONDAY, APRIL 17, 1978 17
SPECIES=6 November 1977

PLOT OF IBIOM_R*ELEV SYMBOL USED IS R
PLOT OF IBIOM_A*ELEV SYMBOL USED IS A



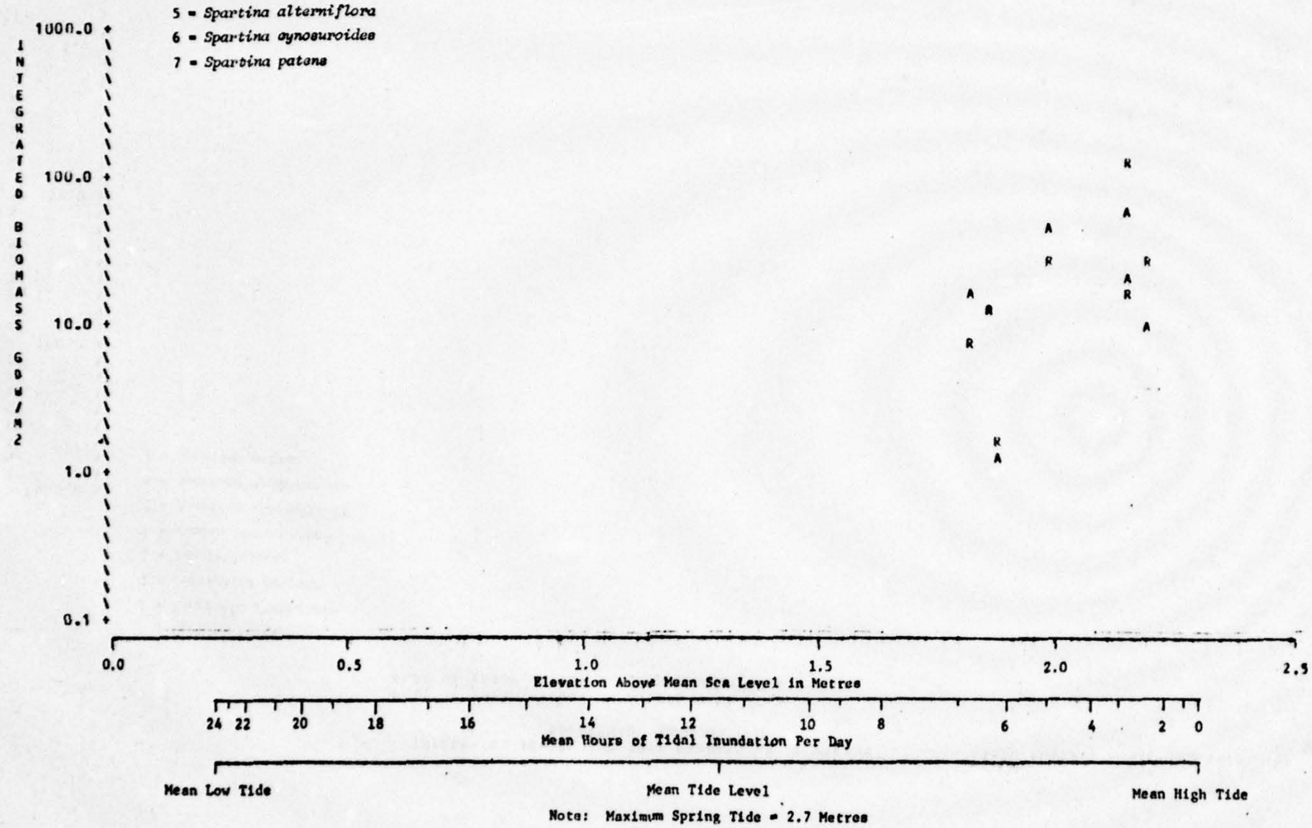
Note: Maximum Spring Tide = 2.7 Metres

INTEGRATED AERIAL AND ROOT BIOMASS VS ELEVATION   23:10 MONDAY, APRIL 17, 1978   19
SPECIES=7   November 1977

PLOT OF IBIOM_R*ELEV   SYMBOL USED IS R
PLOT OF IBIOM_A*ELEV   SYMBOL USED IS A

Species of Plants

1 = *Borrichia frutescens*
2 = *Distichlis spicata*
3 = *Iva frutescens*
4 = *Juncus roemerianus*
5 = *Spartina alterniflora*
6 = *Spartina cynosuroides*
7 = *Spartina patens*



E44

APPENDIX F

CORRELATION MATRIX FOR BUTTERMILK SOUND

FOR DEPENDENT VARIBLES

Parts 1-3

Legend for Dependent Variable Codes

Stem_den	=	Stems /m^2.
Crab_b	=	Crab burrows /m^2.
Elev	=	Elevation (m) above mean low water
Air_b	=	Aerial biomass gdw/m^2.
Rt_bio	=	Root biomass gdw/m^2.
Cond	=	Condition index.
Basal_ar	=	Basal area cm^2/m^2.
Shoot_Ht	=	Average Shoot Height cm.
Fl_Stm	=	Flowering stems /m^2.
Survival	=	Percent survival of original sprigs.
Surv_T	=	Arc sine transformation of percent survival.

Legend for Class Variable Codes

Species

1 = *Borrichia frutescens*

2 = *Distichlis spicata*

3 = *Iva frutescens*

4 = *Juncus roemerianus*

5 = *Spartina alterniflora*

6 = *Spartina cynosuroides*

7 = *Spartina patens*

8 = No plant (control)

Zones

1 = Lower third of intertidal zone.

2 = Middle third of intertidal zone.

3 = Upper third of intertidal zone.

Part 1

Correlations by Zone

Part 2

Correlations by Zone and Species

Part 3

Correlations by Species

PART 1

ZONE=1

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
STEM_DEN	4320	1.78958333	37.10074559	7731.00000000	0	1370.00000000
CRAB_B	4320	0.01393519	0.64542867	60.20000000	0	40.00000000
ELEV	4320	0.02153519	0.14076004	93.03200000	0	4.81000000
COND	4268	0.03983130	0.38644379	170.00000000	0	9.00000000
SHOOT_HT	2139	0.49135110	4.38524772	1051.00000000	0	86.00000000
FL_STM	1920	0.05208333	1.73772651	100.00000000	0	70.00000000
SURVIVAL	470	1.52978723	8.78760066	719.00000000	0	90.00000000
SURV_T	470	0.02743305	0.13988864	12.89353512	0	1.24904577
RT_BIO	1183	3.32603550	60.93660361	3934.70000000	0	1595.00000000
AIR_B	1183	5.29543533	109.66833554	6264.50000000	0	3572.00000000
BASAL_AR	1428	0.05025420	0.48527849	71.76300000	0	6.59000000

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
STEM_DEN	1.00000	0.21555	0.27515	0.49937	0.55103	0.69369	0.74332	0.72092	0.98806	0.72405	0.36759
	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
	4320	4320	4320	4268	2139	1920	470	470	1183	1183	1428
CRAB_B	0.21555	1.00000	0.12684	-0.00161	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	0.0001	0.0000	0.0001	0.9163	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
	4320	4320	4320	4268	2139	1920	470	470	1183	1183	1428
ELEV	0.27515	0.12684	1.00000	0.78727	0.85639	0.15315	0.44738	0.54436	0.57935	0.51196	0.85562
	0.0001	0.0001	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
	4320	4320	4320	4268	2139	1920	470	470	1183	1183	1428
COND	0.49937	-0.00161	0.78727	1.00000	0.85268	0.00000	0.77413	0.82900	0.83479	0.98478	0.83371
	0.0001	0.9163	0.0001	0.0000	0.0001	1.0000	0.0001	0.0001	0.0001	0.0001	0.0001
	4268	4268	4268	4268	2126	1893	466	466	1176	1176	1418
SHOOT_HT	0.55103	0.00000	0.85639	0.85268	1.00000	0.00000	0.87510	0.93653	0.98742	0.91827	0.89818
	0.0001	1.0000	0.0001	0.0001	0.0000	1.0000	0.0001	0.0001	0.0001	0.0001	0.0001
	2139	2139	2139	2126	2139	941	463	463	704	704	1428

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ZONE=1

CORRELATION COEFFICIENTS / PROB > \R\ UNDER HO:RHO=C / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
FL_STM	0.69369 0.0001 1920	0.00000 1.0000 1920	0.15315 0.0001 1920	0.00000 1.0000 1893	0.00000 1.0000 941	1.00000 0.0000 1920	0.00000 1.0000 470	0.00000 1.0000 470	0.94631 0.0001 946	0.57218 0.0001 946	0.00000 1.0000 709
SURVIVAL	0.74332 0.0001 470	0.00000 1.0000 470	0.44738 0.0001 470	0.77413 0.0001 466	0.87510 0.0001 463	0.00000 1.0000 470	1.00000 0.0000 470	0.97957 0.0001 470	0.99202 0.0001 230	0.85968 0.0001 230	0.66955 0.0001 232
SURV_T	0.72092 0.0001 470	0.00000 1.0000 470	0.54436 0.0001 470	0.82900 0.0001 466	0.93653 0.0001 463	0.00000 1.0000 470	0.97957 0.0001 470	1.00000 0.0000 470	0.99991 0.0001 230	0.91183 0.0001 230	0.78853 0.0001 232
RT_BIO	0.98806 0.0001 1183	0.00000 1.0000 1183	0.57935 0.0001 1183	0.83479 0.0001 1176	0.98742 0.0001 704	0.94631 0.0001 946	0.99202 0.0001 230	0.99991 0.0001 230	1.00000 0.0000 1183	0.78363 0.0001 1183	0.96341 0.0001 704
AIR_B	0.72405 0.0001 1183	0.00000 1.0000 1183	0.51196 0.0001 1183	0.98478 0.0001 1176	0.91827 0.0001 704	0.57218 0.0001 946	0.85968 0.0001 230	0.91183 0.0001 230	0.78363 0.0001 1183	1.00000 0.0000 1183	0.91344 0.0001 704
BASAL_AR	0.36759 0.0001 1428	0.00000 1.0000 1428	0.85562 0.0001 1428	0.83371 0.0001 1418	0.89818 0.0001 1428	0.00000 1.0000 709	0.66955 0.0001 232	0.78853 0.0001 232	0.96341 0.0001 704	0.91344 0.0001 704	1.00000 0.0000 1428

ZONE=2

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
STEM_DEN	4322	8.59833410	62.51206356	37162.00000000	0	2200.00000000
CRAB_B	4324	2.57516189	13.86266729	11135.00000000	0	230.00000000
ELEV	4324	0.35982562	0.57738325	1555.88600000	0	2.62800000
COND	3971	0.21808109	0.95531679	866.00000000	0	9.00000000
SHOOT_HT	2092	2.26816444	8.39668582	4745.00000000	0	91.00000000
FL_STM	1920	0.14703125	2.70985532	282.30000000	0	100.00000000
SURVIVAL	476	6.98949580	22.82551423	3327.00000000	0	295.00000000
SURV_T	473	0.10278319	0.26042021	48.61644720	0	1.57079633
RT_BIO	1043	8.16069032	44.04604322	8511.60000000	0	487.00000000
AIR_B	1045	10.62899522	56.64048019	11107.30000000	0	680.00000000
BASAL_AR	1384	0.25033237	1.03859954	346.46000000	0	12.82000000

CORRELATION COEFFICIENTS / PROB > \R\ UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
STEM_DEN	1.00000	0.11489	0.19990	0.38176	0.43938	0.42591	0.77802	0.56376	0.47794	0.52008	0.32860
	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
	4322	4322	4322	3971	2092	1920	476	473	1042	1044	1384
CRAB_B	0.11489	1.00000	0.30636	-0.00750	0.13197	0.04170	-0.01187	0.00692	0.15117	0.20903	0.16192
	0.0001	0.0000	0.0001	0.6364	0.0001	0.0678	0.7961	0.8806	0.0001	0.0001	0.0001
	4322	4324	4324	3971	2092	1920	476	473	1042	1044	1384
ELEV	0.19990	0.30636	1.00000	0.43436	0.55143	0.06415	0.64288	0.85351	0.27691	0.28470	0.47448
	0.0001	0.0001	0.0000	0.0001	0.0001	0.0049	0.0001	0.0001	0.0001	0.0001	0.0001
	4322	4324	4324	3971	2092	1920	476	473	1042	1044	1384
COND	0.38176	-0.00750	0.43436	1.00000	0.80384	0.25512	0.71492	0.82789	0.79696	0.85487	0.64720
	0.0001	0.6364	0.0001	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
	3971	3971	3971	3971	2018	1685	469	466	988	988	1322
SHOOT_HT	0.43938	0.13197	0.55143	0.80384	1.00000	0.23857	0.69333	0.90464	0.71890	0.71084	0.83908
	0.0001	0.0001	0.0001	0.0001	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
	2092	2092	2092	2018	2092	923	456	453	646	648	1383

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ZONE=2

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
FL_STM	0.42591	0.04170	0.06415	0.25512	0.23857	1.00000	0.32109	0.19953	0.23020	0.35932	0.19474
	0.0001	0.0678	0.0049	0.0001	0.0001	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001
	1920	1920	1920	1685	923	1920	475	472	837	839	702
SURVIVAL	0.77802	-0.01187	0.64288	0.71492	0.69335	0.32109	1.00000	0.98342	0.86063	0.78185	0.12257
	0.0001	0.7961	0.0001	0.0001	0.0001	0.0001	0.0000	0.0001	0.0001	0.0001	0.0607
	476	476	476	469	456	475	476	473	218	218	235
SURV_T	0.56326	0.00692	0.85351	0.82789	0.90464	0.19953	0.98342	1.00000	0.89059	0.86178	0.18031
	0.0001	0.8806	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0001	0.0001	0.0058
	473	473	473	466	453	472	473	473	216	216	233
RT_BIO	0.47794	0.15117	0.27691	0.79696	0.71890	0.23020	0.86063	0.89059	1.00000	0.82213	0.69799
	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0001	0.0001
	1042	1042	1042	988	648	837	218	216	1043	1043	640
AIR_B	0.52008	0.20903	0.28470	0.85487	0.71084	0.35932	0.78185	0.86178	0.82213	1.00000	0.66602
	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0001
	1044	1044	1044	988	648	839	218	216	1043	1045	640
BASAL_AR	0.32869	0.16192	0.47448	0.64720	0.83908	0.19474	0.12257	0.18031	0.69799	0.66602	1.00000
	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0607	0.0058	0.0001	0.0001	0.0000
	1384	1384	1384	1322	1383	702	235	233	640	640	1384

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   15:11 MONDAY, APRIL 17, 1978   7

ZONE=3

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
STEM_DEN	4323	160.31529031	772.29590546	693043.00000000	0	17700.00000000
CRAB_B	4324	6.25619796	25.92149032	27051.80000000	0	400.00000000
ELEV	4325	0.98621827	0.97315193	4265.39400000	0	2.85900000
COND	3522	0.70812039	1.56320476	2494.00000000	0	9.00000000
SHOOT_HT	1981	8.16254417	14.99696368	16170.00000000	0	97.00000000
FL_STM	1921	2.24086413	35.69535233	4304.70000000	0	1000.00000000
SURVIVAL	467	25.54603854	60.60931245	11930.00000000	0	582.00000000
SURV_T	441	0.24122618	0.37576181	106.38074657	0	1.57079633
RT_BIO	980	165.16071429	643.66744762	161857.50000000	0	8650.00000000
AIR_B	973	119.77708119	435.50375767	116543.10000000	0	6627.00000000
BASAL_AR	1262	0.97173772	1.88950995	1226.33300000	0	15.56000000

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
STEM_DEN	1.00000 0.0000 4323	0.25599 0.0001 4323	0.21861 0.0001 4323	0.24852 0.0001 3521	0.26818 0.0001 1979	0.07950 0.0005 1921	0.92483 0.0001 467	0.53020 0.0001 441	0.61551 0.0001 980	0.51151 0.0001 973	0.10033 0.0004 1260
CRAB_B	0.25599 0.0001 4323	1.00000 0.0000 4324	0.24512 0.0001 4324	-0.06968 0.0001 3521	0.08045 0.0003 1979	0.05633 0.0135 1921	0.04505 0.3313 467	0.17339 0.0003 441	0.26896 0.0001 980	0.34970 0.0001 973	0.03150 0.2639 1260
ELEV	0.21861 0.0001 4323	0.24512 0.0001 4324	1.00000 0.0000 4325	0.55044 0.0001 3521	0.61241 0.0001 1979	0.04368 0.0556 1921	0.54617 0.0001 467	0.85999 0.0001 441	0.20456 0.0001 980	0.22214 0.0001 973	0.55387 0.0001 1260
COND	0.24852 0.0001 3521	-0.06968 0.0001 3521	0.55044 0.0001 3521	1.00000 0.0000 3522	0.75539 0.0001 1711	0.09041 0.0009 1347	0.56709 0.0001 467	0.79851 0.0001 441	0.24962 0.0001 737	0.34450 0.0001 736	0.51611 0.0001 1013
SHOOT_HT	0.26818 0.0001 1979	0.08045 0.0003 1979	0.61241 0.0001 1979	0.75539 0.0001 1711	1.00000 0.0000 1981	0.06201 0.0667 875	0.43505 0.0001 447	0.75962 0.0001 421	0.39022 0.0001 550	0.61342 0.0001 543	0.77942 0.0001 1262

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ZONE=3

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
FL_STM	0.07950 0.0005 1921	0.05633 0.0135 1921	0.04368 0.0556 1921	0.09041 0.0009 1347	0.06201 0.0667 875	1.00000 0.0000 1921	0.04768 0.3039 467	0.15443 0.0011 441	0.04045 0.2399 846	0.11145 0.0012 844	0.01919 0.6246 653
SURVIVAL	0.92483 0.0001 467	0.04505 0.3313 467	0.54617 0.0001 467	0.56709 0.0001 467	0.43505 0.0001 447	0.04768 0.3039 467	1.00000 0.0000 467	0.98235 0.0001 441	0.03091 0.6507 217	0.55932 0.0001 216	0.14635 0.0271 228
SURV_T	0.53020 0.0001 441	0.17339 0.0003 441	0.85999 0.0001 441	0.79851 0.0001 441	0.75962 0.0001 421	0.15443 0.0011 441	0.98235 0.0001 441	1.00000 0.0000 441	0.09527 0.1807 199	0.59753 0.0001 198	0.44717 0.0001 210
RT_BIO	0.61551 0.0001 980	0.26896 0.0001 980	0.20456 0.0001 980	0.24962 0.0001 737	0.39022 0.0001 550	0.04045 0.2399 846	0.03091 0.6507 217	0.09527 0.1807 199	1.00000 0.0000 980	0.60553 0.0001 970	0.22074 0.0001 533
AIR_B	0.51151 0.0001 973	0.34970 0.0001 973	0.22214 0.0001 973	0.34450 0.0001 736	0.61342 0.0001 543	0.11145 0.0012 844	0.55932 0.0001 216	0.59753 0.0001 198	0.60553 0.0001 970	1.00000 0.0000 973	0.41343 0.0001 532
BASAL_AR	0.10033 0.0004 1260	0.03150 0.2659 1260	0.55387 0.0001 1260	0.51611 0.0001 1013	0.77942 0.0001 1262	0.01919 0.6246 653	0.14635 0.0271 228	0.44717 0.0001 210	0.22074 0.0001 533	0.41343 0.0001 532	1.00000 0.0000 1262

PART 2

ZONE=1 SPECIES=5

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
STEM_DEN	540	13.48333333	103.91750376	7281.00000000	0	1370.00000000
CRAB_B	540	0.09259259	1.77352744	50.00000000	0	40.00000000
ELEV	540	0.09228333	0.24970736	49.83300000	0	0.87300000
COND	510	0.24509804	1.00133775	125.00000000	0	9.00000000
SHOOT_HT	259	3.67953668	11.66496137	953.00000000	0	86.00000000
FL_STM	240	0.41666667	4.90850740	100.00000000	0	70.00000000
SURVIVAL	54	9.61111111	21.51297692	519.00000000	0	90.00000000
SURV_T	54	0.16389911	0.32754169	8.85055217	0	1.24904577
RT_BIO	138	28.51231884	176.95692637	3934.70000000	0	1595.00000000
AIR_B	138	45.39492754	319.27016140	6264.50000000	0	3572.00000000
BASAL_AR	172	0.37891279	1.26012874	65.17300000	0	6.00000000

CORRELATION COEFFICIENTS / PROB > \R\ UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
STEM_DEN	1.00000 0.0000 540	0.21871 0.0001 540	0.38404 0.0001 540	0.49413 0.0001 510	0.56402 0.0001 259	0.69298 0.0001 240	0.76856 0.0001 54	0.75542 0.0001 54	0.98780 0.0001 138	0.71862 0.0001 138	0.37503 0.0001 172
CRAB_B	0.21871 0.0001 540	1.00000 0.0000 540	0.16278 0.0001 540	0.00000 1.0000 510	0.00000 1.0000 259	0.00000 1.0000 240	0.00000 1.0000 54	0.00000 1.0000 54	0.00000 1.0000 138	0.00000 1.0000 138	0.00000 1.0000 172
ELEV	0.38404 0.0001 540	0.16278 0.0001 540	1.00000 0.0000 540	0.89252 0.0001 510	0.85643 0.0001 259	0.22580 0.0004 240	0.74330 0.0001 54	0.84506 0.0001 54	0.64131 0.0001 138	0.56527 0.0001 138	0.86426 0.0001 172
COND	0.49413 0.0001 510	0.00000 1.0000 510	0.89252 0.0001 510	1.00000 0.0000 510	0.85399 0.0001 248	0.00000 1.0000 219	0.70159 0.0001 53	0.78799 0.0001 53	0.83272 0.0001 131	0.98459 0.0001 131	0.82797 0.0001 163
SHOOT_HT	0.56402 0.0001 259	0.00000 1.0000 259	0.85643 0.0001 259	0.85399 0.0001 248	1.00000 0.0000 259	0.00000 1.0000 111	0.89916 0.0001 52	0.95173 0.0001 52	0.98702 0.0001 79	0.91519 0.0001 79	0.89032 0.0001 172

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ZONE=1 SPECIES=5

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
FL_STM	0.69298 0.0001 240	0.00000 1.0000 240	0.22580 0.0004 240	0.00000 1.0000 219	0.00000 1.0000 111	1.00000 0.0000 240	0.00000 1.0000 54	0.00000 1.0000 54	0.94611 0.0001 110	0.56542 0.0001 110	0.00000 1.0000 83
SURVIVAL	0.76856 0.0001 54	0.00000 1.0000 54	0.74330 0.0001 54	0.70159 0.0001 53	0.89916 0.0001 52	0.00000 1.0000 54	1.00000 0.0000 54	0.98286 0.0001 54	0.99156 0.0001 23	0.84948 0.0001 23	0.63135 0.0007 25
SURV_T	0.75542 0.0001 54	0.00000 1.0000 54	0.84506 0.0001 54	0.78799 0.0001 53	0.95173 0.0001 52	0.00000 1.0000 54	0.98286 0.0001 54	1.00000 0.0000 54	0.99990 0.0001 23	0.90494 0.0001 23	0.75949 0.0001 25
RT_BIO	0.98780 0.0001 138	0.00000 1.0000 138	0.64131 0.0001 138	0.83272 0.0001 131	0.98702 0.0001 79	0.94611 0.0001 110	0.99156 0.0001 23	0.99990 0.0001 23	1.00000 0.0000 138	0.77934 0.0001 138	0.96208 0.0001 79
AIR_B	0.71862 0.0001 138	0.00000 1.0000 138	0.56527 0.0001 138	0.98459 0.0001 131	0.91519 0.0001 79	0.56542 0.0001 110	0.84948 0.0001 23	0.90494 0.0001 23	0.77934 0.0001 138	1.00000 0.0000 138	0.91030 0.0001 79
BASAL_AR	0.37503 0.0001 172	0.00000 1.0000 172	0.86426 0.0001 172	0.82797 0.0001 163	0.89032 0.0001 172	0.00000 1.0000 83	0.63135 0.0007 25	0.75949 0.0001 25	0.96208 0.0001 79	0.91030 0.0001 79	1.00000 0.0000 172

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   15:11 MONDAY, APRIL 17, 1978   29

ZONE=2   SPECIES=1

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
STEM_DEN	541	3.77818854	23.40098853	2044.00000000	0	290.00000000
CRAB_B	542	2.30202952	12.40816377	1247.70000000	0	170.00000000
ELEV	542	0.35221771	0.56988874	190.90200000	0	2.12000000
COND	507	0.14398422	0.74187183	73.00000000	0	9.00000000
SHOOT_HT	259	0.79922780	4.77378169	207.00000000	0	55.00000000
FL_STM	240	0.00416667	0.06454972	1.00000000	0	1.00000000
SURVIVAL	61	5.08196721	15.45131611	310.00000000	0	70.00000000
SURV_T	61	0.08625250	0.24028208	5.26140238	0	0.99115659
RT_BIO	130	3.87769231	42.30359683	504.10000000	0	482.00000000
AIR_B	130	3.32384615	29.66612351	432.10000000	0	320.00000000
BASAL_AR	172	0.09598256	0.61735975	16.50900000	0	4.52000000

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
STEM_DEN	1.00000	0.14918	0.18400	0.65681	0.92498	0.04724	0.89802	0.94608	0.29475	0.55732	0.71386
	0.0000	0.0005	0.0001	0.0001	0.0001	0.4664	0.0001	0.0001	0.0007	0.0001	0.0001
	541	541	541	507	259	240	61	61	130	130	172
CRAB_B	0.14918	1.00000	0.28514	-0.03008	0.55137	0.14071	0.12568	0.20445	0.27322	0.25235	0.47895
	0.0005	0.0000	0.0001	0.4992	0.0001	0.0293	0.3345	0.1140	0.0017	0.0038	0.0001
	541	542	542	507	259	240	61	61	130	130	172
ELEV	0.18400	0.28514	1.00000	0.34635	0.39862	0.08745	0.85254	0.93103	0.14380	0.15178	0.37105
	0.0001	0.0001	0.0000	0.0001	0.0001	0.1769	0.0001	0.0001	0.1026	0.0847	0.0001
	541	542	542	507	259	240	61	61	130	130	172
COND	0.65681	-0.03008	0.34635	1.00000	0.85591	0.00000	0.96752	0.95442	1.00000	1.00000	0.35722
	0.0001	0.4992	0.0001	0.0000	0.0001	1.0000	0.0001	0.0001	0.0000	0.0001	0.0001
	507	507	507	507	256	224	61	61	129	129	169
SHOOT_HT	0.92498	0.55137	0.39862	0.85591	1.00000	0.81169	[illegible]	0.91376	1.00000	1.00000	0.53107
	0.0001	0.0001	0.0001	0.0001	0.0000	0.0001	0.0001	0.0001	0.0000	0.0000	0.0001
	259	259	259	256	259	117	58	58	78	78	172

ZONE=2   SPECIES=1

CORRELATION COEFFICIENTS / PROB > |R| UNDER H0:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
FL_STM	0.04724	0.14071	0.08745	0.00000	0.81169	1.00000	0.00000	0.00000	1.00000	1.00000	0.82518
	0.4664	0.0293	0.1769	1.0000	0.0001	0.0000	1.0000	1.0000	0.0000	0.0000	0.0001
	240	240	240	224	117	240	60	60	107	107	90
SURVIVAL	0.89802	0.12568	0.85254	0.96752	0.89332	0.00000	1.00000	0.98437	0.00000	0.00000	0.10098
	0.0001	0.3345	0.0001	0.0001	0.0001	1.0000	0.0000	0.0001	1.0000	1.0000	0.5888
	61	61	61	61	58	60	61	61	27	27	31
SURV_T	0.94609	0.20445	0.93103	0.95442	0.91376	0.00000	0.98437	1.00000	0.00000	0.00000	0.22286
	0.0001	0.1140	0.0001	0.0001	0.0001	1.0000	0.0001	0.0000	1.0000	1.0000	0.2282
	61	61	61	61	58	60	61	61	27	27	31
RT_BIO	0.29475	0.27322	0.14380	1.00000	1.00000	1.00000	0.00000	0.00000	1.00000	0.95768	1.00000
	0.0007	0.0017	0.1026	0.0000	0.0000	0.0000	1.0000	1.0000	0.0000	0.0001	0.0000
	130	130	130	129	78	107	27	27	130	130	78
AIR_B	0.55732	0.25235	0.15178	1.00000	1.00000	1.00000	0.00000	0.00000	0.95768	1.00000	1.00000
	0.0001	0.0038	0.0847	0.0001	0.0000	0.0000	1.0000	1.0000	0.0001	0.0000	0.0000
	130	130	130	129	78	107	27	27	130	130	78
BASAL_AR	0.71386	0.47895	0.37105	0.35722	0.83107	0.82518	0.10098	0.22286	1.00000	1.00000	1.00000
	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.5888	0.2282	0.0000	0.0000	0.0000
	172	172	172	169	172	90	31	31	78	78	172

ZONE=2   SPECIES=2

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
STEM_DEN	540	13.31111111	111.95367228	7188.00000000	0	2200.00000000
CRAB_B	540	3.02462963	16.72608987	1633.30000000	0	190.00000000
ELEV	540	0.33711852	0.58107725	182.04400000	0	2.10000000
COND	497	0.20724346	0.91762966	103.00000000	0	9.00000000
SHOOT_HT	263	1.47528517	5.09961432	388.00000000	0	31.00000000
FL_STM	240	0.00416667	0.06454972	1.00000000	0	1.00000000
SURVIVAL	59	4.44067797	12.40866103	262.00000000	0	80.00000000
SURV_T	59	0.09255727	0.21498654	5.46087873	0	1.10714872
RT_BIO	129	1.16821705	7.72993354	150.71000000	0	65.00000000
AIR_B	129	1.42480620	10.91421830	183.80000000	0	113.00000000
BASAL_AR	175	0.15301714	0.64691219	26.77800000	0	4.64000000

CORRELATION COEFFICIENTS / PROB > |R| UNDER H0:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
STEM_DEN	1.00000	0.07469	0.24096	0.19735	0.71975	-0.00817	0.65674	0.79273	0.18905	0.20442	0.44739
	0.0000	0.0829	0.0001	0.0001	0.0001	0.8998	0.0001	0.0001	0.0319	0.0201	0.0001
	540	540	540	497	263	240	59	59	129	129	175
CRAB_B	0.07469	1.00000	0.33272	-0.01374	0.08176	-0.01288	0.06371	0.14666	0.09376	0.03807	0.08009
	0.0829	0.0000	0.0001	0.7599	0.1862	0.8426	0.6317	0.2677	0.2906	0.6684	0.2920
	540	540	540	497	263	240	59	59	129	129	175
ELEV	0.24096	0.33272	1.00000	0.50367	0.63723	0.11085	0.73347	0.87611	0.30469	0.23141	0.47175
	0.0001	0.0001	0.0000	0.0001	0.0001	0.0866	0.0001	0.0001	0.0004	0.0083	0.0001
	540	540	540	497	263	240	59	59	129	129	175
COND	0.19735	-0.01374	0.50367	1.00000	0.83775	0.00000	0.65606	0.81554	0.00000	0.00000	0.71152
	0.0001	0.7599	0.0001	0.0000	0.0001	1.0000	0.0001	0.0001	1.0000	1.0000	0.0001
	497	497	497	497	254	211	57	57	124	124	167
SHOOT_HT	0.71975	0.08176	0.63723	0.83775	1.00000	0.26983	0.80684	0.92675	0.84428	0.81732	0.87211
	0.0001	0.1862	0.0001	0.0001	0.0000	0.0035	0.0001	0.0001	0.0001	0.0001	0.0001
	263	263	263	254	263	115	57	57	80	80	175

ZONE=2   SPECIES=2

CORRELATION COEFFICIENTS / PROB > |R| UNDER H0:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
FL_STM	-0.00817	-0.01288	0.11095	0.00000	0.26983	1.00000	0.00000	0.00000	0.42690	0.15520	0.38973
	0.8998	0.8426	0.0866	1.0000	0.0035	0.0000	1.0000	1.0000	0.0001	0.1157	0.0002
	240	240	240	211	115	240	59	59	104	104	87
SURVIVAL	0.65674	0.06371	0.73347	0.65606	0.80684	0.00000	1.00000	0.95993	0.00000	0.00000	0.58851
	0.0001	0.6317	0.0001	0.0001	0.0001	1.0000	0.0000	0.0001	1.0000	1.0000	0.0008
	59	59	59	57	57	59	59	59	25	25	29
SURV_T	0.79273	0.14666	0.87611	0.81554	0.92675	0.00000	0.95993	1.00000	0.00000	0.00000	0.76340
	0.0001	0.2677	0.0001	0.0001	0.0001	1.0000	0.0001	0.0000	1.0000	1.0000	0.0001
	59	59	59	57	57	59	59	59	25	25	29
RT_BIO	0.18905	0.09376	0.30469	0.00000	0.84428	0.42690	0.00000	0.00000	1.00000	0.82472	0.97930
	0.0319	0.2906	0.0004	1.0000	0.0001	0.0001	1.0000	1.0000	0.0000	0.0001	0.0001
	129	129	129	124	80	104	25	25	129	129	80
AIR_B	0.20442	0.03807	0.23141	0.00000	0.81732	0.15520	0.00000	0.00000	0.82472	1.00000	0.85663
	0.0201	0.6684	0.0083	1.0000	0.0001	0.1157	1.0000	1.0000	0.0001	0.0000	0.0001
	129	129	129	124	80	104	25	25	129	129	80
BASAL_AR	0.44739	0.08009	0.47175	0.71152	0.87211	0.38973	0.58851	0.76340	0.97930	0.85663	1.00000
	0.0001	0.2920	0.0001	0.0001	0.0001	0.0002	0.0008	0.0001	0.0001	0.0001	0.0000
	175	175	175	167	175	87	29	29	80	80	175

ZONE=2 SPECIES=3

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
STEM_DEN	540	4.69444444	37.94886178	2535.00000000	0	490.00000000
CRAB_G	540	2.70185185	16.18375111	1459.00000000	0	220.00000000
ELEV	540	0.29988889	0.53778750	161.94000000	0	2.13200000
COND	519	0.05009634	0.40436206	26.00000000	0	5.00000000
SHOOT_HT	265	0.08679245	1.41287877	23.00000000	0	23.00000000
FL_STM	240	0	0	0	0	0
SURVIVAL	60	0.16666667	1.29099445	10.00000000	0	10.00000000
SURV_T	60	0.00536251	0.04153782	0.32175055	0	0.32175055
RT_BIO	137	3.30656934	38.70240189	453.00000000	0	453.00000000
AIR_B	137	0.77372263	9.05619117	106.00000000	0	106.00000000
BASAL_AR	176	0.02141477	0.28409906	3.76900000	0	3.76900000

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
STEM_DEN	1.00000	0.08610	0.18608	0.98215	1.00000	0.00000	1.00000	1.00000	1.00000	1.00000	1.00000
	0.0000	0.0455	0.0001	0.0001	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0001
	540	540	540	519	265	240	60	60	137	137	176
CRAB_B	0.08610	1.00000	0.30702	-0.01905	-0.00631	0.00000	-0.02049	-0.02049	-0.01303	-0.01303	-0.00679
	0.0455	0.0000	0.0001	0.6650	0.9186	1.0000	0.8765	0.8765	0.8798	0.8798	0.9287
	540	540	540	519	265	240	60	60	137	137	176
ELEV	0.18608	0.30702	1.00000	0.25027	0.17571	0.00000	0.60582	0.60582	0.16345	0.16345	0.23577
	0.0001	0.0001	0.0000	0.0001	0.0041	1.0000	0.0001	0.0001	0.0563	0.0563	0.0016
	540	540	540	519	265	240	60	60	137	137	176
COND	0.98215	-0.01905	0.25027	1.00000	0.00000	0.00000	1.00000	1.00000	0.00000	0.00000	0.00000
	0.0001	0.6650	0.0001	0.0000	1.0000	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000
	519	519	519	519	264	227	60	60	136	136	175
SHOOT_HT	1.00000	-0.00631	0.17571	0.00000	1.00000	0.00000	0.00000	0.00000	1.00000	1.00000	1.00000
	0.0000	0.9186	0.0041	1.0000	0.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000
	265	265	265	264	265	118	59	59	86	86	176

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   15:11 MONDAY, APRIL 17, 1978   34

ZONE=2   SPECIES=3

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
FL_STM	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
	240	240	240	227	118	240	60	60	110	110	89
SURVIVAL	1.00000	-0.02049	0.60582	1.00000	0.00000	0.00000	1.00000	1.00000	0.00000	0.00000	0.00000
	0.0000	0.8765	0.0001	0.0000	1.0000	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000
	60	60	60	60	59	60	60	60	30	30	30
SURV_T	1.00000	-0.02049	0.60582	1.00000	0.00000	0.00000	1.00000	1.00000	0.00000	0.00000	0.00000
	0.0000	0.8765	0.0001	0.0000	1.0000	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000
	60	60	60	60	59	60	60	60	30	30	30
RT_BIO	1.00000	-0.01303	0.16345	0.00000	1.00000	0.00000	0.00000	0.00000	1.00000	1.00000	1.00000
	0.0000	0.8798	0.0563	1.0000	0.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000
	137	137	137	136	86	110	30	30	137	137	86
AIR_B	1.00000	-0.01303	0.16345	0.00000	1.00000	0.00000	0.00000	0.00000	1.00000	1.00000	1.00000
	0.0000	0.8798	0.0563	1.0000	0.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0001
	137	137	137	136	86	110	30	30	137	137	86
BASAL_AR	1.00000	-0.00679	0.23577	0.00000	1.00000	0.00000	0.00000	0.00000	1.00000	1.00000	1.00000
	0.0001	0.9287	0.0016	1.0000	0.0000	1.0000	1.0000	1.0000	0.0000	0.0001	0.0000
	176	176	176	175	176	89	30	30	86	86	176

ZONE=2   SPECIES=4

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
STEM_DEN	540	2.25370370	17.83079836	1217.00000000	0	340.00000000
CRAB_B	540	2.00537037	11.62459922	1082.90000000	0	190.00000000
ELEV	540	0.30105741	0.54331049	162.57100000	0	1.57700000
COND	508	0.11614173	0.64990917	59.00000000	0	9.00000000
SHOOT_HT	261	0.67432950	4.56210057	176.00000000	0	48.00000000
FL_STM	240	0	0	0	0	0
SURVIVAL	60	5.66666667	15.22338374	340.00000000	0	80.00000000
SURV_T	60	0.10533338	0.24632652	6.32000290	0	1.10714872
RT_BIO	133	0	0	0	0	0
AIR_B	133	0	0	0	0	0
BASAL_AR	178	0.02898315	0.25554878	5.15900000	0	2.79000000

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
STEM_DEN	1.00000	0.22860	0.18784	0.57181	0.78970	0.00000	0.79226	0.91014	0.00000	0.00000	0.87642
	0.0000	0.0001	0.0001	0.0001	0.0001	1.0000	0.0001	0.0001	1.0000	1.0000	0.0001
	540	540	540	508	261	240	60	60	133	133	178
CRAB_B	0.22860	1.00000	0.33450	-0.02652	-0.01569	0.00000	-0.04887	-0.05614	0.00000	0.00000	-0.01196
	0.0001	0.0000	0.0001	0.5510	0.8008	1.0000	0.7108	0.6701	1.0000	1.0000	0.8741
	540	540	540	508	261	240	60	60	133	133	178
ELEV	0.18784	0.33450	1.00000	0.36492	0.41101	0.00000	0.75280	0.87070	0.00000	0.00000	0.29988
	0.0001	0.0001	0.0000	0.0001	0.0001	1.0000	0.0001	0.0001	1.0000	1.0000	0.0001
	540	540	540	508	261	240	60	60	133	133	178
COND	0.57181	-0.02652	0.36492	1.00000	0.35743	0.00000	0.88152	0.93250	0.00000	0.00000	1.00000
	0.0001	0.5510	0.0001	0.0000	0.0001	1.0000	0.0001	0.0001	1.0000	1.0000	0.0000
	508	508	508	508	257	218	57	57	133	133	175
SHOOT_HT	0.78970	-0.01569	0.41101	0.35743	1.00000	0.00000	0.54001	0.90518	0.00000	0.00000	0.83077
	0.0001	0.8008	0.0001	0.0001	0.0000	1.0000	0.0001	0.0001	1.0000	1.0000	0.0001
	261	261	261	257	261	112	53	53	85	85	178

ZONE=2 SPECIES=4

CORRELATION COEFFICIENTS / PROB > |R| UNDER H0:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
FL_STM	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
	240	240	240	218	112	240	60	60	105	105	89
SURVIVAL	0.79226	-0.04887	0.75280	0.88152	0.94001	0.00000	1.00000	0.97350	0.00000	0.00000	0.74509
	0.0001	0.7108	0.0001	0.0001	0.0001	1.0000	0.0000	0.0001	1.0000	1.0000	0.0001
	60	60	60	57	53	60	60	60	28	28	30
SURV_T	0.91014	-0.05614	0.87070	0.93250	0.90518	0.00000	0.97350	1.00000	0.00000	0.00000	0.74509
	0.0001	0.6701	0.0001	0.0001	0.0001	1.0000	0.0001	0.0000	1.0000	1.0000	0.0001
	60	60	60	57	53	60	60	60	28	28	30
RT_BIO	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
	133	133	133	133	85	105	28	28	133	133	85
AIR_B	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
	133	133	133	133	85	105	28	28	133	133	85
BASAL_AR	0.87642	-0.01196	0.29988	1.00000	0.83077	0.00000	0.74509	0.74509	0.00000	0.00000	1.00000
	0.0001	0.8741	0.0001	0.0000	0.0001	1.0000	0.0001	0.0001	1.0000	1.0000	0.0000
	178	178	178	175	178	89	30	30	85	85	178

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S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   15:11 MONDAY, APRIL 17, 1978   37

ZONE=2   SPECIES=5

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
STEM_DEN	541	33.65804067	111.31667987	18209.00000000	0	1140.00000000
CRAB_B	541	4.11571165	16.12286371	2226.60000000	0	205.50000000
ELEV	541	0.59415157	0.64824037	321.43600000	0	2.05000000
COND	408	1.08333333	2.01417987	442.00000000	0	9.00000000
SHOOT_HT	254	12.22440945	17.25880753	3105.00000000	0	91.00000000
FL_STM	240	1.04291667	7.36674876	250.30000000	0	100.00000000
SURVIVAL	59	25.91525424	48.62888603	1529.00000000	0	295.00000000
SURV_T	56	0.28239608	0.37363968	15.81418044	0	1.36943841
RT_BIO	115	54.59043478	88.68874805	6277.90000000	0	451.00000000
AIR_B	117	79.53162393	136.11534133	9305.20000000	0	680.00000000
BASAL_AR	157	1.53951592	2.29620795	241.70400000	0	12.82000000

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
STEM_DEN	1.00000 0.0000 541	0.19651 0.0001 541	0.26418 0.0001 541	0.48846 0.0001 408	0.45063 0.0001 254	0.55979 0.0001 240	0.48327 0.0001 59	0.71631 0.0001 56	0.50753 0.0001 114	0.46654 0.0001 116	0.28595 0.0003 157
CRAB_B	0.19651 0.0001 541	1.00000 0.0000 541	0.28468 0.0001 541	0.05289 0.2865 408	0.30284 0.0001 254	0.06903 0.2868 240	0.19087 0.1476 59	0.39584 0.0025 56	0.38360 0.0001 114	0.49393 0.0001 116	0.21214 0.0076 157
ELEV	0.26418 0.0001 541	0.28468 0.0001 541	1.00000 0.0000 541	0.80331 0.0001 408	0.75936 0.0001 254	0.10626 0.1006 240	0.61075 0.0001 59	0.93062 0.0001 56	0.47491 0.0001 114	0.48151 0.0001 116	0.66180 0.0001 157
COND	0.48846 0.0001 408	0.05289 0.2865 408	0.80331 0.0001 408	1.00000 0.0000 408	0.86237 0.0001 210	0.26786 0.0010 147	0.64932 0.0001 59	0.94850 0.0001 56	0.78351 0.0001 72	0.81930 0.0001 72	0.62265 0.0001 121
SHOOT_HT	0.45063 0.0001 254	0.30284 0.0001 254	0.75936 0.0001 254	0.86237 0.0001 210	1.00000 0.0000 254	0.17684 0.0558 114	0.57563 0.0001 59	0.90713 0.0001 56	0.73985 0.0001 71	0.61045 0.0001 71	0.77577 0.0001 157

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S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   15:11 MONDAY, APRIL 17, 1978   38

ZONE=2   SPECIES=5

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
FL_STM	0.55979	0.06903	0.10626	0.26786	0.19684	1.00000	0.33917	0.31547	0.23826	0.34362	0.10100
	0.0001	0.2868	0.1006	0.0010	0.0358	0.0000	0.0086	0.0179	0.0215	0.0007	0.3606
	240	240	240	147	114	240	59	56	93	95	84
SURVIVAL	0.88327	0.19087	0.61075	0.64932	0.57583	0.33917	1.00000	0.99082	0.84552	0.72972	0.79280
	0.0001	0.1476	0.0001	0.0001	0.0001	0.0086	0.0000	0.0001	0.0001	0.0001	0.0001
	59	59	59	59	59	59	59	56	27	27	29
SURV_T	0.71631	0.39584	0.93062	0.94850	0.90713	0.31547	0.99082	1.00000	0.87560	0.83625	0.94883
	0.0001	0.0025	0.0001	0.0001	0.0001	0.0179	0.0001	0.0000	0.0001	0.0001	0.0001
	56	56	56	56	56	56	56	56	25	25	27
RT_BIO	0.50753	0.38360	0.47491	0.78331	0.73985	0.23826	0.84552	0.87560	1.00000	0.76476	0.64116
	0.0001	0.0001	0.0001	0.0001	0.0001	0.0215	0.0001	0.0001	0.0000	0.0001	0.0001
	114	114	114	72	71	93	27	25	115	115	63
AIR_B	0.46654	0.49393	0.48151	0.81930	0.61045	0.34362	0.72972	0.83625	0.76476	1.00000	0.58077
	0.0001	0.0001	0.0001	0.0001	0.0001	0.0007	0.0001	0.0001	0.0001	0.0000	0.0001
	116	116	116	72	71	95	27	25	115	117	63
BASAL_AR	0.28595	0.21214	0.66180	0.62265	0.77577	0.10100	0.79280	0.94883	0.64116	0.58077	1.00000
	0.0003	0.0076	0.0001	0.0001	0.0001	0.3606	0.0001	0.0001	0.0001	0.0001	0.0000
	157	157	157	121	157	84	29	27	63	63	157

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   15:11 MONDAY, APRIL 17, 1978   39

ZONE=2   SPECIES=6

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
STEM_DEN	540	5.25740741	34.48080912	2839.00000000	0	620.00000000
CRAB_B	540	2.41777778	11.68718193	1305.60000000	0	100.00000000
ELEV	540	0.37088519	0.57389468	200.27800000	0	1.69100000
COND	483	0.17598344	0.84485434	85.00000000	0	9.00000000
SHOOT_HT	257	2.24902724	8.14997658	578.00000000	0	55.00000000
FL_STM	240	0	0	0	0	0
SURVIVAL	57	6.92982456	19.30752968	395.00000000	0	100.00000000
SURV_T	57	0.12494354	0.30680437	7.12178203	0	1.57079633
HT_BIO	122	8.68032787	56.92394032	1059.00000000	0	450.00000000
AIR_B	122	8.53278689	59.33490665	1041.00000000	0	510.00000000
BASAL_AR	171	0.29791813	1.07716247	50.94400000	0	6.28200000

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	HT_BIO	AIR_B	BASAL_AR
STEM_DEN	1.00000	0.20436	0.20696	0.67176	0.56260	0.00000	0.54821	0.57844	0.70088	0.75977	0.58965
	0.0000	0.0001	0.0001	0.0001	0.0001	1.0000	0.0001	0.0001	0.0001	0.0001	0.0001
	540	540	540	483	257	240	57	57	122	122	171
CRAB_B	0.20436	1.00000	0.32359	-0.02314	0.03721	0.00000	-0.04839	-0.05490	-0.01530	-0.01895	0.20302
	0.0001	0.0000	0.0001	0.6120	0.5526	1.0000	0.7208	0.6850	0.8672	0.8359	0.0077
	540	540	540	483	257	240	57	57	122	122	171
ELEV	0.20696	0.32359	1.00000	0.42441	0.58363	0.00000	0.73165	0.82526	0.29349	0.27501	0.54020
	0.0001	0.0001	0.0000	0.0001	0.0001	1.0000	0.0001	0.0001	0.0010	0.0022	0.0001
	540	540	540	483	257	240	57	57	122	122	171
COND	0.67176	-0.02314	0.42441	1.00000	0.61169	0.00000	0.86191	0.89575	0.00000	0.00000	0.80871
	0.0001	0.6120	0.0001	0.0000	0.0001	1.0000	0.0001	0.0001	1.0000	1.0000	0.0001
	483	483	483	483	244	198	55	55	117	117	160
SHOOT_HT	0.55260	0.03721	0.58363	0.61169	1.00000	0.00000	0.85076	0.92266	0.82888	0.95979	0.91752
	0.0001	0.5526	0.0001	0.0001	0.0000	1.0000	0.0001	0.0001	0.0001	0.0001	0.0001
	257	257	257	244	257	110	51	51	76	76	171

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ZONE=2   SPECIES=6

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
FL_STM	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
	240	240	240	198	110	240	57	57	99	99	86
SURVIVAL	0.54821	-0.04839	0.73165	0.86191	0.85076	0.00000	1.00000	0.98350	0.00000	0.00000	0.97591
	0.0001	0.7208	0.0001	0.0001	0.0001	1.0000	0.0000	0.0001	1.0000	1.0000	0.0001
	57	57	57	55	51	57	57	57	25	25	27
SURV_T	0.57844	-0.05490	0.82526	0.89575	0.92206	0.00000	0.98350	1.00000	0.00000	0.00000	0.99805
	0.0001	0.6850	0.0001	0.0001	0.0001	1.0000	0.0001	0.0000	1.0000	1.0000	0.0001
	57	57	57	55	51	57	57	57	25	25	27
RT_BIO	0.70088	-0.01530	0.29349	0.00000	0.82888	0.00000	0.00000	0.00000	1.00000	0.99353	0.90231
	0.0001	0.8672	0.0010	1.0000	0.0001	1.0000	1.0000	1.0000	0.0000	0.0001	0.0001
	122	122	122	117	76	99	25	25	122	122	76
AIR_B	0.75977	-0.01895	0.27501	0.00000	0.95979	0.00000	0.00000	0.00000	0.99353	1.00000	0.99069
	0.0001	0.8359	0.0022	1.0000	0.0001	1.0000	1.0000	1.0000	0.0001	0.0000	0.0001
	122	122	122	117	76	99	25	25	122	122	76
BASAL_AR	0.58903	0.20302	0.54020	0.80871	0.91752	0.00000	0.97591	0.99805	0.90231	0.99069	1.00000
	0.0001	0.0077	0.0001	0.0001	0.0001	1.0000	0.0001	0.0001	0.0001	0.0001	0.0000
	171	171	171	160	171	86	27	27	76	76	171

ZONE=2   SPECIES=7

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
STEM_DEN	540	1.11666667	9.70049154	603.00000000	0	180.00000000
CRAB_D	540	1.54277778	10.51250354	833.10000000	0	130.00000000
ELEV	540	0.29560000	0.54601442	159.62400000	0	1.81700000
COND	525	0.14857143	0.72629383	78.00000000	0	9.00000000
SHOOT_HT	264	1.01515152	5.08630436	268.00000000	0	46.00000000
FL_STM	240	0	0	0	0	0
SURVIVAL	60	8.01666667	20.49678906	481.00000000	0	100.00000000
SURV_T	60	0.13860750	0.32144088	8.31645017	0	1.57079633
RT_BIO	136	0.49191176	5.73662767	66.90000000	0	66.90000000
AIR_D	136	0.28823529	3.36137227	39.20000000	0	39.20000000
BASAL_AR	176	0.00907386	0.10424806	1.59700000	0	1.38000000

CORRELATION COEFFICIENTS / PROB > |R| UNDER H0:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_D	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_D	BASAL_AR
STEM_DEN	1.00000	-0.01683	0.14130	0.60586	0.84812	0.00000	0.52144	0.62962	1.00000	1.00000	0.31273
	0.0000	0.6965	0.0010	0.0001	0.0001	1.0000	0.0001	0.0001	0.0000	0.0000	0.0001
	540	540	540	525	264	240	60	60	136	136	176
CRAB_D	-0.01683	1.00000	0.27940	-0.03002	-0.01911	0.00000	-0.05135	-0.05661	-0.01533	-0.01533	0.13763
	0.6965	0.0000	0.0001	0.4925	0.7573	1.0000	0.6968	0.6675	0.8594	0.8594	0.0685
	540	540	540	525	264	240	60	60	136	136	176
ELEV	0.14130	0.27940	1.00000	0.40583	0.55108	0.00000	0.74596	0.82805	0.17630	0.17630	0.25361
	0.0010	0.0001	0.0000	0.0001	0.0001	1.0000	0.0001	0.0001	0.0401	0.0401	0.0007
	540	540	540	525	264	240	60	60	136	136	176
COND	0.60586	-0.03002	0.40583	1.00000	0.73102	0.00000	0.60934	0.69500	1.00000	1.00000	0.36329
	0.0001	0.4925	0.0001	0.0000	0.0001	1.0000	0.0001	0.0001	0.0000	0.0000	0.0001
	525	525	525	525	264	230	60	60	136	136	176
SHOOT_HT	0.84812	-0.01911	0.55108	0.73102	1.00000	0.00000	0.34289	0.91005	1.00000	1.00000	0.91391
	0.0001	0.7573	0.0001	0.0001	0.0000	1.0000	0.0001	0.0001	0.0000	0.0001	0.0001
	264	264	264	264	264	118	59	59	83	83	175

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ZONE=2   SPECIES=7

CORRELATION COEFFICIENTS / PROB > \R\ UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
FL_STM	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
	240	240	240	230	118	240	60	60	108	108	88
SURVIVAL	0.52144	-0.05135	0.74396	0.60934	0.84289	0.00000	1.00000	0.98590	1.00000	1.00000	0.77876
	0.0001	0.6968	0.0001	0.0001	0.0001	1.0000	0.0000	0.0001	0.0000	0.0001	0.0001
	60	60	60	60	59	30	60	60	26	26	29
SURV_T	0.62962	-0.05661	0.82803	0.69500	0.91005	0.00000	0.98590	1.00000	1.00000	1.00000	0.84872
	0.0001	0.6675	0.0001	0.0001	0.0001	1.0000	0.0001	0.0000	0.0000	0.0000	0.0001
	60	60	60	60	59	60	60	60	26	26	29
RT_BIO	1.00000	-0.01533	0.17630	1.00000	1.00000	0.00000	1.00000	1.00000	1.00000	1.00000	1.00000
	0.0000	0.8594	0.0401	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	136	136	136	136	83	108	26	26	136	136	83
AIR_B	1.00000	-0.01533	0.17630	1.00000	1.00000	0.00000	1.00000	1.00000	1.00000	1.00000	1.00000
	0.0000	0.8594	0.0401	0.0000	0.0001	1.0000	0.0001	0.0000	0.0000	0.0000	0.0001
	136	136	136	136	83	108	26	26	136	136	83
BASAL_AR	0.31275	0.13763	0.25361	0.36329	0.91391	0.00000	0.77876	0.84872	1.00000	1.00000	1.00000
	0.0001	0.0685	0.0007	0.0001	0.0001	1.0000	0.0001	0.0001	0.0000	0.0001	0.0000
	176	176	176	176	175	88	29	29	83	83	176

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S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   15:11 MONDAY, APRIL 17, 1978   43

ZONE=2   SPECIES=8

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
STEM_DEN	540	4.67962963	44.44616046	2527.00000000	0	770.00000000
CRAB_B	541	2.48946396	14.07015162	1346.80000000	0	230.00000000
ELEV	541	0.32734011	0.55656952	177.09100000	0	2.62800000
COND	524	0	0	0	0	0
SHOOT_HT	269	0	0	0	0	0
FL_STM	240	0.12500000	1.93649167	30.00000000	0	30.00000000
SURVIVAL	60	0	0	0	0	0
SURV_T	60	0	0	0	0	0
HT_BIO	141	0	0	0	0	0
AIR_B	141	0	0	0	0	0
BASAL_AR	179	0	0	0	0	0

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	HT_BIO	AIR_B	BASAL_AR
STEM_DEN	1.00000	0.03486	0.12624	0.00000	0.00000	0.82481	0.00000	0.00000	0.00000	0.00000	0.00000
	0.0000	0.4189	0.0033	1.0000	1.0000	0.0001	1.0000	1.0000	1.0000	1.0000	1.0000
	540	540	540	524	269	240	60	60	141	141	179
CRAB_B	0.03486	1.00000	0.30921	0.00000	0.00000	-0.00199	0.00000	0.00000	0.00000	0.00000	0.00000
	0.4189	0.0000	0.0001	1.0000	1.0000	0.9755	1.0000	1.0000	1.0000	1.0000	1.0000
	540	541	541	524	269	240	60	60	141	141	179
ELEV	0.12624	0.30921	1.00000	0.00000	0.00000	0.03664	0.00000	0.00000	0.00000	0.00000	0.00000
	0.0033	0.0001	0.0000	1.0000	1.0000	0.5721	1.0000	1.0000	1.0000	1.0000	1.0000
	540	541	541	524	269	240	60	60	141	141	179
COND	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
	524	524	524	524	269	230	60	60	141	141	179
SHOOT_HT	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
	269	269	269	269	269	119	60	60	89	89	179

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   15:11 MONDAY, APRIL 17, 1978   44

ZONE=2   SPECIES=R

CORRELATION COEFFICIENTS / PROB > \R\ UNDER H0:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAD_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
FL_STM	0.82481 0.0001 240	-0.00199 0.9755 240	0.03664 0.5721 240	0.00000 1.0000 230	0.00000 1.0000 119	1.00000 0.0000 240	0.00000 1.0000 60	0.00000 1.0000 60	0.00000 1.0000 111	0.00000 1.0000 111	0.00000 1.0000 89
SURVIVAL	0.00000 1.0000 60	0.00000 1.0000 60	0.00000 1.0000 60	0.00000 1.0000 60	0.00000 1.0000 60	0.00000 1.0000 60	0.00000 1.0000 60	0.00000 1.0000 60	0.00000 1.0000 30	0.00000 1.0000 30	0.00000 1.0000 30
SURV_T	0.00000 1.0000 60	0.00000 1.0000 60	0.00000 1.0000 60	0.00000 1.0000 60	0.00000 1.0000 60	0.00000 1.0000 60	0.00000 1.0000 60	0.00000 1.0000 60	0.00000 1.0000 30	0.00000 1.0000 30	0.00000 1.0000 30
RT_BIO	0.00000 1.0000 141	0.00000 1.0000 141	0.00000 1.0000 141	0.00000 1.0000 141	0.00000 1.0000 89	0.00000 1.0000 111	0.00000 1.0000 30	0.00000 1.0000 30	0.00000 1.0000 141	0.00000 1.0000 141	0.00000 1.0000 89
AIR_B	0.00000 1.0000 141	0.00000 1.0000 141	0.00000 1.0000 141	0.00000 1.0000 141	0.00000 1.0000 89	0.00000 1.0000 111	0.00000 1.0000 30	0.00000 1.0000 30	0.00000 1.0000 141	0.00000 1.0000 141	0.00000 1.0000 89
BASAL_AR	0.00000 1.0000 179	0.00000 1.0000 179	0.00000 1.0000 179	0.00000 1.0000 179	0.00000 1.0000 179	0.00000 1.0000 89	0.00000 1.0000 30	0.00000 1.0000 30	0.00000 1.0000 89	0.00000 1.0000 89	0.00000 1.0000 179

ZONE=3   SPECIES=1

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
STEM_DEN	540	25.60740741	112.73495581	13828.00000000	0	2000.00000000
CRAB_B	540	5.31092593	18.85119768	2867.90000000	0	170.00000000
ELEV	540	1.15613889	0.98548686	624.31500000	0	2.85900000
COND	400	1.11250000	1.91938894	445.00000000	0	5.00000000
SHOOT_HT	245	8.53469388	12.79327358	2091.00000000	0	52.00000000
FL_STM	241	1.64771784	16.93198911	397.10000000	0	250.00000000
SURVIVAL	58	18.58620690	31.79596934	1078.00000000	0	100.00000000
SURV_T	58	0.32907893	0.46630622	19.08657790	0	1.57079633
RT_BIO	120	112.74250000	296.03628714	13529.10000000	0	2510.00000000
AIR_B	120	83.77583333	169.75636075	10053.10000000	0	1000.00000000
BASAL_AR	154	1.77945455	2.45763261	274.03600000	0	7.34000000

CORRELATION COEFFICIENTS / PROB > \R\ UNDER H0:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
STEM_DEN	1.00000	0.21068	0.18948	0.44977	0.23626	0.05655	0.39175	0.53998	0.83628	0.65516	0.13809
	0.0000	0.0001	0.0001	0.0001	0.0002	0.3821	0.0024	0.0001	0.0001	0.0001	0.0887
	540	540	540	399	244	241	58	58	120	120	153
CRAB_B	0.21068	1.00000	0.24012	-0.06979	0.27979	0.32409	0.24143	0.22164	0.54931	0.40666	0.22046
	0.0001	0.0000	0.0001	0.1641	0.0001	0.0001	0.0679	0.0945	0.0001	0.0001	0.0062
	540	540	540	399	244	241	58	58	120	120	153
ELEV	0.18948	0.24012	1.00000	0.64186	0.61117	0.05469	0.59683	0.72280	0.21332	0.28052	0.65495
	0.0001	0.0001	0.0000	0.0001	0.0001	0.3980	0.0001	0.0001	0.0193	0.0019	0.0001
	540	540	540	399	244	241	58	58	120	120	153
COND	0.44977	-0.06979	0.64186	1.00000	0.80412	0.12183	0.57761	0.71081	0.54562	0.37187	0.58664
	0.0001	0.1641	0.0001	0.0000	0.0001	0.1458	0.0001	0.0001	0.0001	0.0011	0.0001
	399	399	399	400	203	144	58	58	74	74	116
SHOOT_HT	0.23626	0.27979	0.61117	0.80412	1.00000	0.36650	0.49284	0.62425	0.61025	0.71260	0.81611
	0.0002	0.0001	0.0001	0.0001	0.0000	0.0001	0.0002	0.0001	0.0001	0.0001	0.0001
	244	244	244	203	245	109	53	53	65	64	154

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   15:11 MONDAY, APRIL 17, 1978   46

ZONE=3   SPECIES=1

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
FL_STM	0.05655	0.32409	0.05469	0.12183	0.36650	1.00000	0.00000	0.00000	0.06747	0.02174	0.41572
	0.3821	0.0001	0.3950	0.1458	0.0001	0.0000	1.0000	1.0000	0.4899	0.8241	0.0001
	241	241	241	144	109	241	58	58	107	107	84
SURVIVAL	0.39175	0.24143	0.59683	0.57761	0.49284	0.00000	1.00000	0.98129	0.38357	0.38429	0.48389
	0.0024	0.0679	0.0001	0.0001	0.0002	1.0000	0.0000	0.0001	0.0400	0.0396	0.0078
	58	58	58	58	53	58	58	58	29	29	29
SURV_T	0.53998	0.22164	0.72280	0.71081	0.62425	0.00000	0.98129	1.00000	0.57958	0.54934	0.66387
	0.0001	0.0945	0.0001	0.0001	0.0001	1.0000	0.0001	0.0000	0.0010	0.0020	0.0001
	58	58	58	58	53	58	58	58	29	29	29
RT_BIO	0.83628	0.54931	0.21332	0.54562	0.61025	0.06747	0.38357	0.57958	1.00000	0.72580	0.64202
	0.0001	0.0001	0.0193	0.0001	0.0001	0.4899	0.0400	0.0010	0.0000	0.0001	0.0001
	120	120	120	74	65	107	29	29	120	119	61
AIR_B	0.65516	0.40666	0.28052	0.37187	0.71260	0.02174	0.38429	0.54934	0.72580	1.00000	0.73769
	0.0001	0.0001	0.0019	0.0011	0.0001	0.8241	0.0396	0.0020	0.0001	0.0000	0.0001
	120	120	120	74	64	107	29	29	119	120	60
BASAL_AR	0.13809	0.22046	0.65495	0.58664	0.81611	0.41572	0.48389	0.66387	0.64202	0.73769	1.00000
	0.0887	0.0062	0.0001	0.0001	0.0001	0.0001	0.0078	0.0001	0.0001	0.0001	0.0000
	153	153	153	116	154	84	29	29	61	60	154

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   15:11 MONDAY, APRIL 17, 1978   47

ZONE=3   SPECIES=2

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
STEM_DEN	540	437.94259259	956.08705989	236489.00000000	0	7300.00000000
CRAB_B	540	12.87129630	44.39678006	6950.50000000	0	400.00000000
ELEV	540	1.12092037	0.99833284	605.29700000	0	2.39200000
COND	382	1.24083770	1.95610823	474.00000000	0	5.00000000
SHOOT_HT	234	6.99572650	8.92193029	1637.00000000	0	45.00000000
FL_STM	240	7.97750000	69.51127395	1914.60000000	0	800.00000000
SURVIVAL	59	50.44067797	79.96380236	2976.00000000	0	361.00000000
SURV_T	47	0.25465955	0.37535063	11.96899885	0	1.09476251
RT_BIO	127	187.24488189	300.96997786	23780.10000000	0	1800.00000000
AIR_B	124	139.46693548	205.41713475	17293.90000000	0	970.00000000
BASAL_AR	136	0.56119853	0.68941430	76.32300000	0	2.38900000

CORRELATION COEFFICIENTS / PROB > |R| UNDER H0:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
STEM_DEN	1.00000	0.29430	0.43858	0.33216	0.58228	0.18564	0.97750	0.79439	0.69434	0.64662	0.48759
	0.0000	0.0001	0.0001	0.0001	0.0001	0.0039	0.0001	0.0001	0.0001	0.0001	0.0001
	540	540	540	382	234	240	59	47	127	124	136
CRAB_B	0.29430	1.00000	0.26833	-0.04811	0.14113	0.00899	0.00000	0.00000	0.31610	0.21548	0.12492
	0.0001	0.0000	0.0001	0.3484	0.0309	0.8898	1.0000	1.0000	0.0003	0.0162	0.1473
	540	540	540	382	234	240	59	47	127	124	136
ELEV	0.43858	0.26833	1.00000	0.82275	0.81299	0.07012	0.70259	0.95668	0.59820	0.44205	0.78028
	0.0001	0.0001	0.0000	0.0001	0.0001	0.2793	0.0001	0.0001	0.0001	0.0001	0.0001
	540	540	540	382	234	240	59	47	127	124	136
COND	0.33216	-0.04811	0.82275	1.00000	0.92616	0.15535	0.67951	0.94627	0.41895	0.43395	0.38804
	0.0001	0.3484	0.0001	0.0000	0.0001	0.0799	0.0001	0.0001	0.0004	0.0003	0.0002
	382	382	382	382	180	128	59	47	67	66	89
SHOOT_HT	0.58228	0.14113	0.81299	0.92616	1.00000	0.31373	0.60498	0.91672	0.69262	0.62554	0.79478
	0.0001	0.0309	0.0001	0.0001	0.0000	0.0011	0.0001	0.0001	0.0001	0.0001	0.0001
	234	234	234	180	234	106	59	47	73	69	136

F31

ZONE=3 SPECIES=2

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
FL_STM	0.18564	0.00899	0.07012	0.15535	0.31373	1.00000	0.02735	0.35920	0.26602	0.22330	0.21699
	0.0039	0.8898	0.2793	0.0799	0.0011	0.0000	0.8371	0.0132	0.0052	0.0196	0.0615
	240	240	240	128	106	240	59	47	109	109	75
SURVIVAL	0.97755	0.00000	0.70259	0.67951	0.60498	0.02735	1.00000	0.98995	-0.02460	0.92263	0.72057
	0.0001	1.0000	0.0001	0.0001	0.0001	0.8371	0.0000	0.0001	0.8992	0.0001	0.0001
	59	59	59	59	59	59	59	47	29	28	29
SURV_T	0.79439	0.00000	0.95668	0.94627	0.91672	0.35920	0.98995	1.00000	0.37322	0.93153	0.80182
	0.0001	1.0000	0.0001	0.0001	0.0001	0.0132	0.0001	0.0000	0.1155	0.0001	0.0001
	47	47	47	47	47	47	47	47	19	18	19
RT_BIO	0.69434	0.31610	0.39820	0.41895	0.69262	0.26602	-0.02460	0.37322	1.00000	0.66769	0.68445
	0.0001	0.0003	0.0001	0.0004	0.0001	0.0052	0.8992	0.1155	0.0000	0.0001	0.0001
	127	127	127	67	73	109	29	19	127	123	66
AIR_B	0.64662	0.21548	0.44205	0.43395	0.62554	0.22330	0.92263	0.93153	0.66769	1.00000	0.66994
	0.0001	0.0162	0.0001	0.0003	0.0001	0.0196	0.0001	0.0001	0.0001	0.0000	0.0001
	124	124	124	66	69	109	28	18	123	124	65
BASAL_AR	0.48759	0.12492	0.78028	0.38804	0.79478	0.21699	0.72057	0.80182	0.68445	0.66994	1.00000
	0.0001	0.1473	0.0001	0.0002	0.0001	0.0615	0.0001	0.0001	0.0001	0.0001	0.0000
	136	136	136	89	136	75	29	19	66	65	136

STATISTICAL ANALYSIS SYSTEM 15:11 MONDAY, APRIL 17, 1978 49

ZONE=3 SPECIES=3

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
STEM_DEN	541	21.74861368	177.57409414	11766.00000000	0	2860.00000000
CRAB_B	541	5.60147874	19.62020872	3030.40000000	0	160.00000000
ELEV	541	0.96987800	0.98454549	524.70400000	0	2.25600000
COND	467	0.39828694	1.11747592	186.00000000	0	5.00000000
SHOOT_HT	248	6.04435484	15.45615610	1499.00000000	0	81.00000000
FL_STM	240	4.19166667	64.54926384	1006.00000000	0	1000.00000000
SURVIVAL	59	12.37288136	20.28580131	730.00000000	0	70.00000000
SURV_T	59	0.21646290	0.32506267	12.77131110	0	0.99115659
RT_BIO	119	99.04117647	457.58427813	11785.90000000	0	3668.00000000
AIR_B	118	81.77796610	464.00882952	9649.80000000	0	4626.00000000
BASAL_AR	168	0.83577976	2.31579315	140.41100000	0	15.56000000

CORRELATION COEFFICIENTS / PROB > \R\ UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
STEM_DEN	1.00000	0.18580	0.12068	0.17108	0.09028	0.23657	0.87622	0.90839	0.66204	0.24417	0.02380
	0.0000	0.0001	0.0049	0.0002	0.1563	0.0002	0.0001	0.0001	0.0001	0.0077	0.7595
	541	541	541	467	248	240	59	59	119	118	168
CRAB_B	0.18580	1.00000	0.29023	-0.06925	0.02911	0.20875	0.00000	0.00000	0.54429	0.27508	0.03218
	0.0001	0.0000	0.0001	0.1351	0.6482	0.0011	1.0000	1.0000	0.0001	0.0026	0.6788
	541	541	541	467	248	240	59	59	119	118	168
ELEV	0.12068	0.29023	1.00000	0.41785	0.50198	0.03161	0.85666	0.93368	0.17022	0.13751	0.43764
	0.0049	0.0001	0.0000	0.0001	0.0001	0.6261	0.0001	0.0001	0.0642	0.1376	0.0001
	541	541	541	467	248	240	59	59	119	118	168
COND	0.17108	-0.06925	0.41785	1.00000	0.72462	0.00000	0.90693	0.90547	0.60722	0.81119	0.60703
	0.0002	0.1351	0.0001	0.0000	0.0001	1.0000	0.0001	0.0001	0.0001	0.0001	0.0001
	467	467	467	467	230	187	59	59	104	104	152
SHOOT_HT	0.09028	0.02911	0.50198	0.72462	1.00000	0.00000	0.81884	0.85368	0.86145	0.91436	0.78640
	0.1563	0.6482	0.0001	0.0001	0.0000	1.0000	0.0001	0.0001	0.0001	0.0001	0.0001
	248	248	248	230	248	105	48	48	71	71	168

F33

ZONE=3 SPECIES=3

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
FL_STM	0.23657	0.20875	0.03161	0.00000	0.00000	1.00000	0.F0000	0.00000	0.05514	0.33306	0.00000
	0.0002	0.0011	0.6261	1.0000	1.0000	0.0000	1.0000	1.0000	0.5878	0.0008	1.0000
	240	240	240	187	105	240	59	59	99	98	85
SURVIVAL	0.87622	0.00000	0.85666	0.90693	0.81884	0.00000	1.00000	0.98292	0.80576	0.90030	0.79720
	0.0001	1.0000	0.0001	0.0001	0.0001	1.0000	0.0000	0.0001	0.0001	0.0001	0.0001
	59	59	59	59	48	59	59	59	24	24	29
SURV_T	0.90839	0.00000	0.93368	0.90547	0.85368	0.00000	0.98292	1.00000	0.79951	0.89620	0.85143
	0.0001	1.0000	0.0001	0.0001	0.0001	1.0000	0.0001	0.0000	0.0001	0.0001	0.0001
	59	59	59	59	48	59	59	59	24	24	29
RT_BIO	0.66204	0.54429	0.17022	0.60722	0.86145	0.05514	0.80576	0.79951	1.00000	0.37908	0.14831
	0.0001	0.0001	0.0642	0.0001	0.0001	0.5878	0.0001	0.0001	0.0000	0.0001	0.2171
	119	119	119	104	71	99	24	24	119	118	71
AIR_B	0.24417	0.27508	0.13751	0.81119	0.91436	0.33306	0.90030	0.89620	0.37908	1.00000	0.12423
	0.0077	0.0026	0.1376	0.0001	0.0001	0.0008	0.0001	0.0001	0.0001	0.0000	0.3020
	118	118	118	104	71	98	24	24	118	118	71
BASAL_AR	0.02380	0.03218	0.43764	0.60703	0.78640	0.00000	0.79720	0.85143	0.14831	0.12423	1.00000
	0.7595	0.6788	0.0001	0.0001	0.0001	1.0000	0.0001	0.0001	0.2171	0.3020	0.0000
	168	168	168	152	166	85	29	29	71	71	168

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   15:11 MONDAY, APRIL 17, 1978   51

ZONE=3   SPECIES=4

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
STEM_DEN	542	136.22324723	633.32118156	73833.00000000	0	8100.00000000
CRAB_B	543	4.44604052	17.38533064	2414.21000000	0	200.00000000
ELEV	543	0.97571823	0.95252750	529.81500000	0	2.24500000
COND	460	0.54565217	1.35765505	251.00000000	0	9.00000000
SHOOT_HT	252	9.93253968	17.89253591	2503.00000000	0	74.00000000
FL_STM	240	3.72041667	29.73183985	892.90000000	0	330.00000000
SURVIVAL	56	18.50000000	28.46241541	1036.00000000	0	90.00000000
SURV_T	56	0.30581866	0.41295216	17.12544477	0	1.24904577
RT_BIO	128	122.80234375	532.44356848	15718.20000000	0	4180.00000000
AIR_B	125	136.32320000	508.60431339	17040.40000000	0	3070.00000000
BASAL_AR	164	0.59800000	1.10948081	98.07200000	0	4.48000000

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
STEM_DEN	1.00000	0.23919	0.21710	0.42411	0.27833	0.06036	0.26159	0.30868	0.37703	0.63213	0.27283
	0.0000	0.0001	0.0001	0.0001	0.0001	0.3518	0.0515	0.0206	0.0001	0.0001	0.0004
	542	542	542	460	252	240	56	56	128	125	164
CRAB_B	0.23919	1.00000	0.24401	-0.05903	0.23306	-0.02420	0.26685	0.27107	0.30690	0.67065	0.13233
	0.0001	0.0000	0.0001	0.2064	0.0002	0.7091	0.0468	0.0433	0.0004	0.0001	0.0912
	542	543	543	460	252	240	56	56	128	125	164
ELEV	0.21710	0.24401	1.00000	0.46225	0.63537	0.09754	0.76511	0.86732	0.22448	0.25167	0.61667
	0.0001	0.0001	0.0000	0.0001	0.0001	0.1319	0.0001	0.0001	0.0109	0.0046	0.0001
	542	543	543	460	252	240	56	56	128	125	164
COND	0.42411	-0.05903	0.46225	1.00000	0.85353	0.27631	0.62293	0.72045	0.62802	0.64482	0.78808
	0.0001	0.2064	0.0001	0.0000	0.0001	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001
	460	460	460	460	225	183	56	56	111	111	142
SHOOT_HT	0.27833	0.23306	0.63537	0.85353	1.00000	0.00000	0.67396	0.78109	0.61383	0.64269	0.90819
	0.0001	0.0002	0.0001	0.0001	0.0000	1.0000	0.0001	0.0001	0.0001	0.0001	0.0001
	252	252	252	225	252	108	53	53	72	70	164

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   15:11 MONDAY, APRIL 17, 1978   52

ZONE=3   SPECIES=4

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_D	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
FL_STM	0.05036	-0.02420	0.09754	0.27631	0.00000	1.00000	0.00000	0.00000	-0.01329	-0.01371	0.00000
	0.3518	0.7091	0.1319	0.0002	1.0000	0.0000	1.0000	1.0000	0.8919	0.8691	1.0000
	240	240	240	183	108	240	56	56	107	106	82
SURVIVAL	0.26159	0.26685	0.76511	0.62293	0.67396	0.00000	1.00000	0.98330	0.90052	0.86771	0.83751
	0.0515	0.0468	0.0001	0.0001	0.0001	1.0000	0.0000	0.0001	0.0001	0.0001	0.0001
	56	56	56	56	53	56	56	56	25	25	27
SURV_T	0.30868	0.27107	0.86732	0.72045	0.78109	0.00000	0.98330	1.00000	0.92299	0.87893	0.91229
	0.0206	0.0433	0.0001	0.0001	0.0001	1.0000	0.0001	0.0000	0.0001	0.0001	0.0001
	56	56	56	56	53	56	56	56	25	25	27
RT_BIO	0.37703	0.30690	0.22448	0.62802	0.61383	-0.01329	0.90052	0.92299	1.00000	0.75693	0.85310
	0.0001	0.0004	0.0109	0.0001	0.0001	0.8919	0.0001	0.0001	0.0000	0.0001	0.0001
	128	128	128	111	72	107	25	25	128	125	70
AIR_B	0.63213	0.67065	0.25167	0.64482	0.64289	-0.01371	0.86771	0.87893	0.75693	1.00000	0.77792
	0.0001	0.0001	0.0046	0.0001	0.0001	0.8891	0.0001	0.0001	0.0001	0.0000	0.0001
	125	125	125	111	70	106	25	25	125	125	70
BASAL_AR	0.27283	0.13233	0.61667	0.78808	0.90819	0.00000	0.83751	0.91229	0.85310	0.77792	1.00000
	0.0004	0.0912	0.0001	0.0001	0.0001	1.0000	0.0001	0.0001	0.0001	0.0001	0.0000
	164	164	164	142	164	82	27	27	70	70	164

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   15:11 MONDAY, APRIL 17, 1978   53

ZONE=3   SPECIES=5

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
STEM_DEN	540	13.18148148	46.27112594	7118.00000000	0	420.00000000
CRAB_B	540	4.38851852	17.91756162	2369.80000000	0	190.00000000
ELEV	541	0.95645841	0.95735989	517.44400000	0	2.24200000
COND	442	0.84841629	1.66792054	375.00000000	0	5.00000000
SHOOT_HT	247	8.92307692	13.46382362	2204.00000000	0	81.00000000
FL_STM	240	0.09625000	0.81396448	23.10000000	0	11.00000000
SURVIVAL	57	14.98245614	20.55870621	854.00000000	0	85.00000000
SURV_T	57	0.27486593	0.33066892	15.66735827	0	1.17305651
RT_BIO	110	101.08909091	670.75014098	11119.80000000	0	7000.00000000
AIR_B	110	37.73545455	103.24289130	4150.90000000	0	621.00000000
BASAL_AR	153	1.34269281	1.97430135	205.48200000	0	9.30000000

CORRELATION COEFFICIENTS / PROB > \R\ UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
STEM_DEN	1.00000	0.22447	0.26151	0.46365	0.33842	0.15366	0.75034	0.69233	0.03485	0.29718	0.27386
	0.0000	0.0001	0.0001	0.0001	0.0001	0.0172	0.0001	0.0001	0.7178	0.0016	0.0006
	540	540	540	442	246	240	57	57	110	110	152
CRAB_B	0.22447	1.00000	0.25387	-0.10472	0.25141	-0.03310	0.13984	0.16765	0.01548	0.27784	0.18819
	0.0001	0.0000	0.0001	0.0277	0.0001	0.6099	0.2995	0.2126	0.8725	0.0033	0.0202
	540	540	540	442	246	240	57	57	110	110	152
ELEV	0.26151	0.25387	1.00000	0.57458	0.63186	0.08183	0.79538	0.90440	0.07860	0.23438	0.61686
	0.0001	0.0001	0.0000	0.0001	0.0001	0.2065	0.0001	0.0001	0.4144	0.0137	0.0001
	540	540	541	442	246	240	57	57	110	110	152
COND	0.46365	-0.10472	0.57458	1.00000	0.83201	0.27172	0.77485	0.87511	0.33254	0.74094	0.65774
	0.0001	0.0277	0.0001	0.0000	0.0001	0.0004	0.0001	0.0001	0.0028	0.0001	0.0001
	442	442	442	442	204	168	57	57	79	79	113
SHOOT_HT	0.33842	0.25141	0.63186	0.83201	1.00000	0.41519	0.72918	0.82602	0.16477	0.71441	0.83847
	0.0001	0.0001	0.0001	0.0001	0.0000	0.0001	0.0001	0.0001	0.2206	0.0001	0.0001
	246	246	246	204	247	110	57	57	57	57	153

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ZONE=3   SPECIES=5

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
FL_STM	0.15366	-0.03310	0.08183	0.27172	0.41519	1.00000	0.48188	0.41597	0.01574	0.29246	0.25507
	0.0172	0.6099	0.2065	0.0006	0.0001	0.0000	0.0001	0.0013	0.8784	0.0037	0.0233
	240	240	240	168	110	240	57	57	97	97	79
SURVIVAL	0.75034	0.13984	0.79588	0.77485	0.72918	0.48188	1.00000	0.97449	0.07040	0.84925	0.27663
	0.0001	0.2995	0.0001	0.0001	0.0001	0.0001	0.0000	0.0001	0.7438	0.0001	0.1713
	57	57	57	57	57	57	57	57	24	24	26
SURV_T	0.69233	0.16765	0.90440	0.87511	0.82602	0.41597	0.97449	1.00000	0.14931	0.81199	0.36698
	0.0001	0.2126	0.0001	0.0001	0.0001	0.0013	0.0001	0.0000	0.4862	0.0001	0.0652
	57	57	57	57	57	57	57	57	24	24	26
RT_BIO	0.03485	0.01548	0.07860	0.33254	0.16477	0.01574	0.07040	0.14931	1.00000	0.78834	0.48183
	0.7178	0.8725	0.4144	0.0028	0.2206	0.8784	0.7438	0.4862	0.0000	0.0001	0.0003
	110	110	110	79	57	97	24	24	110	109	53
AIR_B	0.29718	0.27784	0.23438	0.74094	0.71441	0.29246	0.84925	0.81199	0.78834	1.00000	0.65360
	0.0016	0.0033	0.0137	0.0001	0.0001	0.0037	0.0001	0.0001	0.0001	0.0000	0.0001
	110	110	110	79	57	97	24	24	109	110	54
BASAL_AR	0.27386	0.18819	0.61686	0.65724	0.83847	0.25507	0.27663	0.36698	0.48183	0.65360	1.00000
	0.0006	0.0202	0.0001	0.0001	0.0001	0.0233	0.1713	0.0652	0.0003	0.0001	0.0000
	152	152	152	113	153	79	26	26	53	54	153

STATISTICAL ANALYSIS SYSTEM 15:11 MONDAY, APRIL 17, 1978 55

ZONE=3 SPECIES=6

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
STEM_DEN	540	26.67037037	159.62570625	14402.00000000	0	3100.00000000
CRAB_B	540	3.67592593	12.85939714	1985.00000000	0	120.00000000
ELEV	540	1.02364630	0.95325829	552.76900000	0	2.37100000
COND	418	0.73923445	1.49545800	309.00000000	0	5.00000000
SHOOT_HT	254	13.70866142	20.13260790	3482.00000000	0	97.00000000
FL_STM	240	0.29583333	2.65127729	71.00000000	0	30.00000000
SURVIVAL	59	16.00000000	26.88737686	944.00000000	0	100.00000000
SURV_T	59	0.28810760	0.39810518	16.99834817	0	1.57079633
RT_BIO	108	103.24907407	231.61186575	11150.90000000	0	1221.00000000
AIR_B	108	100.83888889	235.69631492	10890.60000000	0	1500.00000000
BASAL_AR	166	1.91321687	2.61513051	317.59400000	0	11.97000000

CORRELATION COEFFICIENTS / PROB > \R\ UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
STEM_DEN	1.00000	0.05669	0.16268	0.53971	0.25928	0.01067	0.39336	0.54340	0.13024	0.27125	0.23742
	0.0000	0.1884	0.0001	0.0001	0.0001	0.8693	0.0021	0.0001	0.1791	0.0045	0.0021
	540	540	540	418	254	240	59	59	108	108	166
CRAB_B	0.05669	1.00000	0.26051	-0.07835	0.22467	0.03802	0.07958	0.11127	0.20299	0.07535	0.26330
	0.1884	0.0000	0.0001	0.1097	0.0003	0.5578	0.5491	0.4014	0.0351	0.4381	0.0006
	540	540	540	418	254	240	59	59	108	108	166
ELEV	0.16268	0.26051	1.00000	0.59383	0.66991	0.06711	0.62721	0.77274	0.35363	0.27396	0.66583
	0.0001	0.0001	0.0000	0.0001	0.0001	0.3005	0.0001	0.0001	0.0002	0.0041	0.0001
	540	540	540	418	254	240	59	59	108	108	166
COND	0.53971	-0.07835	0.59383	1.00000	0.77619	0.00000	0.47954	0.63873	0.30998	0.80907	0.65069
	0.0001	0.1097	0.0001	0.0000	0.0001	1.0000	0.0001	0.0001	0.0101	0.0001	0.0001
	418	418	418	418	198	153	59	59	68	68	110
SHOOT_HT	0.25928	0.22467	0.66991	0.77619	1.00000	0.23123	0.57000	0.70348	0.65936	0.63186	0.88498
	0.0001	0.0003	0.0001	0.0001	0.0000	0.0121	0.0001	0.0001	0.0001	0.0001	0.0001
	254	254	254	198	254	117	58	58	58	58	166

ZONE=3   SPECIES=6

CORRELATION COEFFICIENTS / PROB > \R\ UNDER H0:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
FL_STM	0.01067	0.03802	0.06711	0.00000	0.23123	1.00000	0.00000	0.00000	0.18129	0.31095	0.15147
	0.8693	0.5578	0.3005	1.0000	0.0121	0.0000	1.0000	1.0000	0.0669	0.0014	0.1589
	240	240	240	153	117	240	59	59	103	103	88
SURVIVAL	0.39336	0.07958	0.62721	0.47954	0.57000	0.00000	1.00000	0.97600	0.39373	0.41755	0.17428
	0.0021	0.5491	0.0001	0.0001	0.0001	1.0000	0.0000	0.0001	0.0421	0.0302	0.3659
	59	59	59	59	58	59	59	59	27	27	29
SURV_T	0.54340	0.11127	0.77274	0.63873	0.70348	0.00000	0.97600	1.00000	0.50247	0.52235	0.25911
	0.0001	0.4014	0.0001	0.0001	0.0001	1.0000	0.0001	0.0000	0.0076	0.0052	0.1747
	59	59	59	59	58	59	59	59	27	27	29
RT_BIO	0.13024	0.20299	0.35363	0.30998	0.65936	0.18129	0.39373	0.50247	1.00000	0.47009	0.75423
	0.1791	0.0351	0.0002	0.0101	0.0001	0.0669	0.0421	0.0076	0.0000	0.0001	0.0001
	108	108	108	68	58	103	27	27	108	108	58
AIR_B	0.27125	0.07538	0.27396	0.80907	0.63186	0.31095	0.41755	0.52235	0.47009	1.00000	0.69109
	0.0045	0.4381	0.0041	0.0001	0.0001	0.0014	0.0302	0.0052	0.0001	0.0000	0.0001
	108	108	108	68	58	103	27	27	108	108	58
BASAL_AR	0.25742	0.26330	0.66583	0.65069	0.88498	0.15147	0.17428	0.25911	0.75423	0.69109	1.00000
	0.0021	0.0006	0.0001	0.0001	0.0001	0.1589	0.3659	0.1747	0.0001	0.0001	0.0000
	166	166	166	110	166	88	29	29	58	58	166

STATISTICAL ANALYSIS SYSTEM 15:11 MONDAY, APRIL 17, 1978 57

ZONE=3 SPECIES=7

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
STEM_DEN	540	610.71666667	1725.32928623	329787.00000000	0	17700.00000000
CRAB_B	540	9.88648148	39.65102949	5339.70000000	0	400.00000000
ELEV	540	1.02276481	0.94172312	552.29300000	0	2.52000000
COND	426	1.06572770	1.89746557	454.00000000	0	5.00000000
SHOOT_HT	234	11.58974359	17.23239481	2712.00000000	0	95.00000000
FL_STM	240	0	0	0	0	0
SURVIVAL	59	73.08474576	125.44160451	4312.00000000	0	582.00000000
SURV_T	45	0.28360683	0.42469517	12.76230751	0	1.28403977
RT_BIO	123	607.91056911	1397.30514509	74773.00000000	0	8650.00000000
AIR_B	123	385.88943089	902.55984405	47464.40000000	0	6627.00000000
BASAL_AR	144	0.75722917	1.18412125	109.04100000	0	6.27000000

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
STEM_DEN	1.00000 0.0000 540	0.28915 0.0001 540	0.36484 0.0001 540	0.32870 0.0001 426	0.46836 0.0001 234	0.00000 1.0000 240	0.59997 0.0001 59	0.99450 0.0001 45	0.74165 0.0001 123	0.51534 0.0001 123	0.36557 0.0001 144
CRAB_B	0.28915 0.0001 540	1.00000 0.0000 540	0.24771 0.0001 540	-0.06944 0.1525 426	0.21211 0.0011 234	0.00000 1.0000 240	-0.03651 0.7837 59	0.27173 0.0710 45	0.47045 0.0001 123	0.70951 0.0001 123	0.11783 0.1596 144
ELEV	0.36484 0.0001 540	0.24771 0.0001 540	1.00000 0.0000 540	0.69969 0.0001 426	0.71963 0.0001 234	0.00000 1.0000 240	0.65947 0.0001 59	0.96689 0.0001 45	0.34896 0.0001 123	0.35573 0.0001 123	0.61309 0.0001 144
COND	0.32870 0.0001 426	-0.06944 0.1525 426	0.69969 0.0001 426	1.00000 0.0000 426	0.94093 0.0001 206	0.00000 1.0000 153	0.61449 0.0001 59	0.96628 0.0001 45	0.42208 0.0001 89	0.34977 0.0008 89	0.59053 0.0001 116
SHOOT_HT	0.46836 0.0001 234	0.21211 0.0011 234	0.71963 0.0001 234	0.94093 0.0001 206	1.00000 0.0000 234	0.00000 1.0000 102	0.53231 0.0001 59	0.91877 0.0001 45	0.65382 0.0001 68	0.81866 0.0001 68	0.77355 0.0001 144

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ZONE=3 SPECIES=7

CORRELATION COEFFICIENTS / PROB > \R\ UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_H	BASAL_AR
FL_STM	0.00000 1.0000 240	0.00000 1.0000 240	0.00000 1.0000 240	0.00000 1.0000 153	0.00000 1.0000 102	0.00000 1.0000 240	0.00000 1.0000 59	0.00000 1.0000 45	0.00000 1.0000 109	0.00000 1.0000 109	0.00000 1.0000 72
SURVIVAL	0.99997 0.0001 59	-0.03651 0.7837 59	0.65947 0.0001 59	0.61449 0.0001 59	0.53231 0.0001 59	0.00000 1.0000 59	1.00000 0.0000 59	0.99450 0.0001 45	0.61019 0.0004 29	0.72147 0.0001 29	0.66945 0.0001 29
SURV_T	0.99450 0.0001 45	0.27173 0.0710 45	0.96689 0.0001 45	0.96628 0.0001 45	0.91877 0.0001 45	0.00000 1.0000 45	0.99450 0.0001 45	1.00000 0.0000 45	0.84123 0.0001 21	0.91546 0.0001 21	0.97136 0.0001 21
RT_BIO	0.74165 0.0001 123	0.47045 0.0001 123	0.34896 0.0001 123	0.42208 0.0001 89	0.65382 0.0001 68	0.00000 1.0000 109	0.61019 0.0004 29	0.84123 0.0001 21	1.00000 0.0000 123	0.57476 0.0001 123	0.66480 0.0001 68
AIR_B	0.51534 0.0001 123	0.70951 0.0001 123	0.35573 0.0001 123	0.34977 0.0008 89	0.81866 0.0001 68	0.00000 1.0000 109	0.72147 0.0001 29	0.91546 0.0001 21	0.57476 0.0001 123	1.00000 0.0000 123	0.82339 0.0001 68
BASAL_AR	0.36557 0.0001 144	0.11783 0.1596 144	0.61309 0.0001 144	0.59053 0.0001 116	0.77355 0.0001 144	0.00000 1.0000 72	0.66945 0.0001 29	0.97136 0.0001 21	0.66480 0.0001 68	0.82339 0.0001 68	1.00000 0.0000 144

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   15:11 MONDAY, APRIL 17, 1978   59

ZONE=5   SPECIES=H

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
STEM_DEN	540	10.77777778	191.69091993	5820.00000000	0	4400.00000000
CRAB_B	540	3.88018519	15.39475358	2095.30000000	0	140.00000000
ELEV	540	0.66436481	0.93662335	358.77700000	0	2.79200000
COND	527	0	0	0	0	0
SHOOT_HT	267	0.15730337	2.01067944	42.00000000	0	31.00000000
FL_STM	240	0	0	0	0	0
SURVIVAL	60	0	0	0	0	0
SURV_T	60	0	0	0	0	0
RT_BIO	145	0	0	0	0	0
AIR_B	145	0	0	0	0	0
BASAL_AR	177	0.03064407	0.32791069	5.42400000	0	4.19200000

CORRELATION COEFFICIENTS / PROB > |R| UNDER H0:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
STEM_DEN	1.00000 0.0000 540	0.02120 0.6231 540	0.08281 0.0545 540	0.00000 1.0000 527	0.98723 0.0001 267	0.00000 1.0000 240	0.00000 1.0000 60	0.00000 1.0000 60	0.00000 1.0000 145	0.00000 1.0000 145	0.99451 0.0001 177
CRAB_B	0.02120 0.6231 540	1.00000 0.0000 540	0.35648 0.0001 540	0.00000 1.0000 527	0.73529 0.0001 267	0.00000 1.0000 240	0.00000 1.0000 60	0.00000 1.0000 60	0.00000 1.0000 145	0.00000 1.0000 145	0.74795 0.0001 177
ELEV	0.08281 0.0545 540	0.35648 0.0001 540	1.00000 0.0000 540	0.00000 1.0000 527	0.14577 0.0171 267	0.00000 1.0000 240	0.00000 1.0000 60	0.00000 1.0000 60	0.00000 1.0000 145	0.00000 1.0000 145	0.16044 0.0329 177
COND	0.00000 1.0000 527	0.00000 1.0000 527	0.00000 1.0000 527	0.00000 1.0000 527	0.00000 1.0000 265	0.00000 1.0000 231	0.00000 1.0000 60	0.00000 1.0000 60	0.00000 1.0000 145	0.00000 1.0000 145	0.00000 1.0000 175
SHOOT_HT	0.98723 0.0001 267	0.73529 0.0001 267	0.14577 0.0171 267	0.00000 1.0000 265	1.00000 0.0000 267	0.00000 1.0000 118	0.00000 1.0000 60	0.00000 1.0000 60	0.00000 1.0000 86	0.00000 1.0000 86	0.99847 0.0001 177

ZONE=3   SPECIES=F

CORRELATION COEFFICIENTS / PROB > |R| UNDER H0:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
FL_STM	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
	240	240	240	231	118	240	60	60	115	115	88
SURVIVAL	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
	60	60	60	60	60	60	60	60	30	30	30
SURV_T	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
	60	60	60	60	60	60	60	60	30	30	30
RT_BIO	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
	145	145	145	145	86	115	30	30	145	145	86
AIR_B	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
	145	145	145	145	86	115	30	30	145	145	86
BASAL_AR	0.99451	0.74795	0.16044	0.00000	0.99847	0.00000	0.00000	0.00000	0.00000	0.00000	1.00000
	0.0001	0.0001	0.0329	1.0000	0.0001	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
	177	177	177	175	177	88	30	30	86	86	177

F44

PART 3

SPECIES=1

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
STEM_DEN	1622	9.97225647	67.52647367	16175.00000000	0	2000.00000000
CRAB_B	1622	2.53736128	13.20127431	4115.60000000	0	170.00000000
ELEV	1623	0.50448121	0.81516433	818.77300000	0	2.85900000
COND	1445	0.35916955	1.19688857	519.00000000	0	9.00000000
SHOOT_HT	774	2.96899225	8.58736819	2298.00000000	0	55.00000000
FL_STM	721	0.55214979	9.80657653	398.10000000	0	250.00000000
SURVIVAL	179	7.75418994	21.56765998	1388.00000000	0	100.00000000
SURV_T	179	0.13602224	0.32912231	24.34798028	0	1.57079633
RT_BIO	400	35.08300000	171.20134802	14033.20000000	0	2510.00000000
AIR_B	400	26.21300000	101.51205359	10485.20000000	0	1000.00000000
BASAL_AR	506	0.57419960	1.60932883	290.54500000	0	7.34000000

CORRELATION COEFFICIENTS / PROB > \R\ UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
STEM_DEN	1.00000 0.0000 1622	0.21537 0.0001 1621	0.24105 0.0001 1622	0.47730 0.0001 1444	0.25030 0.0001 773	0.07272 0.0510 721	0.54319 0.0001 179	0.66724 0.0001 179	0.84293 0.0001 400	0.68320 0.0001 400	0.18523 0.0001 505
CRAB_B	0.21537 0.0001 1621	1.00000 0.0000 1622	0.29657 0.0001 1622	-0.02814 0.2853 1444	0.24618 0.0001 773	0.30759 0.0001 721	0.19146 0.0102 179	0.20760 0.0053 179	0.55974 0.0001 400	0.44196 0.0001 400	0.16431 0.0002 505
ELEV	0.24105 0.0001 1622	0.29657 0.0001 1622	1.00000 0.0000 1623	0.64711 0.0001 1444	0.67257 0.0001 773	0.08538 0.0219 721	0.70338 0.0001 179	0.81204 0.0001 179	0.33463 0.0001 400	0.42119 0.0001 400	0.71139 0.0001 505
COND	0.47730 0.0001 1444	-0.02814 0.2853 1444	0.64711 0.0001 1444	1.00000 0.0000 1445	0.84258 0.0001 729	0.13683 0.0007 608	0.70088 0.0001 179	0.80161 0.0001 179	0.60100 0.0001 353	0.44475 0.0001 353	0.63851 0.0001 465
SHOOT_HT	0.25030 0.0001 773	0.24618 0.0001 773	0.67257 0.0001 773	0.84258 0.0001 729	1.00000 0.0000 774	0.39637 0.0001 146	0.63099 0.0001 171	0.74110 0.0001 171	0.67603 0.0001 233	0.77039 0.0001 232	0.85621 0.0001 506

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SPECIES=1

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
FL_STM	0.07272	0.30759	0.08538	0.13683	0.39637	1.00000	0.00000	0.00000	0.10898	0.07684	0.45811
	0.0510	0.0001	0.0219	0.0007	0.0001	0.0000	1.0000	1.0000	0.0466	0.1612	0.0001
	721	721	721	608	346	721	178	178	334	334	264
SURVIVAL	0.54319	0.19146	0.70338	0.70088	0.63099	0.00000	1.00000	0.98240	0.53058	0.52225	0.10887
	0.0001	0.0102	0.0001	0.0001	0.0001	1.0000	0.0000	0.0001	0.0001	0.0001	0.3071
	179	179	179	179	171	178	179	179	86	86	90
SURV_T	0.66724	0.20760	0.81204	0.80161	0.74110	0.00000	0.98240	1.00000	0.70565	0.67513	0.18490
	0.0001	0.0053	0.0001	0.0001	0.0001	1.0000	0.0001	0.0000	0.0001	0.0001	0.0810
	179	179	179	179	171	178	179	179	86	86	90
RT_BIO	0.84293	0.55974	0.33463	0.60100	0.67603	0.10898	0.53058	0.70565	1.00000	0.75911	0.69822
	0.0001	0.0001	0.0001	0.0001	0.0001	0.0466	0.0001	0.0001	0.0000	0.0001	0.0001
	400	400	400	353	233	334	86	86	400	399	229
AIR_B	0.68320	0.44196	0.42119	0.44475	0.77039	0.07684	0.52225	0.67513	0.75911	1.00000	0.76189
	0.0001	0.0001	0.0001	0.0001	0.0001	0.1612	0.0001	0.0001	0.0001	0.0000	0.0001
	400	400	400	353	232	334	86	86	399	400	228
BASAL_AR	0.18523	0.16431	0.71139	0.63851	0.85621	0.45811	0.10887	0.18490	0.69822	0.76189	1.00000
	0.0001	0.0002	0.0001	0.0001	0.0001	0.0001	0.3071	0.0810	0.0001	0.0001	0.0000
	505	505	505	465	506	264	90	90	229	228	506

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SPECIES=2

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
STEM_DEN	1621	152.43861814	596.46981397	247103.00000000	0	7300.00000000
CRAB_B	1621	5.35718692	28.01082076	8684.00000000	0	400.00000000
ELEV	1621	0.49002529	0.81532172	794.33100000	0	2.39200000
COND	1414	0.40876945	1.26181080	578.00000000	0	9.00000000
SHOOT_HT	767	2.67796610	6.53624736	2054.00000000	0	45.00000000
FL_STM	721	2.66102635	40.22476357	1918.60000000	0	800.00000000
SURVIVAL	178	18.19101124	51.65145606	3238.00000000	0	361.00000000
SURV_T	166	0.10499926	0.25684456	17.42987758	0	1.10714872
RT_BIO	406	61.72610837	196.28632100	25060.80000000	0	1800.00000000
AIR_B	403	44.03895782	131.09642229	17747.70000000	0	970.00000000
BASAL_AR	491	0.21291242	0.57804267	104.54000000	0	4.64000000

CORRELATION COEFFICIENTS / PROB > \R\ UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
STEM_DEN	1.00000	0.32810	0.49133	0.34652	0.56086	0.20359	0.97662	0.79111	0.77006	0.73344	0.43095
	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
	1621	1621	1621	1414	767	721	178	166	406	403	491
CRAB_B	0.32810	1.00000	0.33614	-0.00861	0.17808	0.03209	-0.01244	0.06835	0.42367	0.33571	0.14527
	0.0001	0.0000	0.0001	0.7464	0.0001	0.3896	0.8691	0.3816	0.0001	0.0001	0.0012
	1621	1621	1621	1414	767	721	178	166	406	403	491
ELEV	0.49133	0.33614	1.00000	0.78372	0.82178	0.10409	0.72910	0.94183	0.54000	0.58511	0.70648
	0.0001	0.0001	0.0000	0.0001	0.0001	0.0051	0.0001	0.0001	0.0001	0.0001	0.0001
	1621	1621	1621	1414	767	721	178	166	406	403	491
COND	0.34652	-0.00861	0.78372	1.00000	0.91332	0.17492	0.72565	0.97624	0.50530	0.54396	0.51543
	0.0001	0.7464	0.0001	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
	1414	1414	1414	1414	703	578	176	164	340	339	435
SHOOT_HT	0.56086	0.17808	0.82178	0.91332	1.00000	0.29443	0.63819	0.92225	0.72360	0.68447	0.83620
	0.0001	0.0001	0.0001	0.0001	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
	767	767	767	703	767	341	176	164	243	239	491

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SPECIES=2

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
FL_STM	0.20359	0.03209	0.10409	0.17492	0.29443	1.00000	0.08728	0.33448	0.28626	0.25987	0.22549
	0.0001	0.3896	0.0051	0.0001	0.0001	0.0000	0.2467	0.0001	0.0001	0.0001	0.0003
	721	721	721	578	341	721	178	166	333	333	252
SURVIVAL	0.97662	-0.01244	0.72910	0.72565	0.63819	0.08728	1.00000	0.98265	0.07467	0.93993	0.73196
	0.0001	0.8691	0.0001	0.0001	0.0001	0.2467	0.0000	0.0001	0.4996	0.0001	0.0001
	178	178	178	176	176	178	178	166	84	83	88
SURV_T	0.79111	0.06855	0.94183	0.92624	0.92225	0.33448	0.98265	1.00000	0.41271	0.93715	0.79359
	0.0001	0.3816	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0003	0.0001	0.0001
	166	166	166	164	164	166	166	166	74	73	78
RT_BIO	0.77006	0.42367	0.54000	0.50530	0.72360	0.28620	0.07467	0.41271	1.00000	0.73670	0.61316
	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.4996	0.0003	0.0000	0.0001	0.0001
	405	406	406	340	243	333	84	74	406	402	236
AIR_B	0.73344	0.33571	0.58511	0.54396	0.68447	0.25987	0.93993	0.93715	0.73670	1.00000	0.61347
	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0001
	403	403	403	339	239	333	83	73	402	403	235
BASAL_AR	0.43095	0.14527	0.70648	0.51543	0.83620	0.22549	0.73196	0.79359	0.61316	0.61347	1.00000
	0.0001	0.0012	0.0001	0.0001	0.0001	0.0003	0.0001	0.0001	0.0001	0.0001	0.0000
	491	491	491	435	491	252	88	78	236	235	491

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SPECIES=3

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
STEM_DEN	1621	8.82233189	105.24935363	14301.00000000	0	2800.00000000
CRAB_B	1621	2.76952498	14.55597456	4489.40000000	0	220.00000000
ELEV	1621	0.42359284	0.76413858	686.64400000	0	2.25600000
COND	1526	0.13892529	0.68355294	212.00000000	0	5.00000000
SHOOT_HT	783	1.94380587	9.16162961	1522.00000000	0	81.00000000
FL_STM	720	1.39722222	37.26815945	1006.00000000	0	1000.00000000
SURVIVAL	179	4.13407821	12.96945030	740.00000000	0	70.00000000
SURV_T	179	0.07314560	0.21251506	13.09306166	0	0.99115659
RT_BIO	406	30.14507389	251.95920552	12238.90000000	0	3668.00000000
AIR_B	405	24.08839506	252.49235914	9755.80000000	0	4626.00000000
BASAL_AR	524	0.27515267	1.37409137	144.18000000	0	15.56000000

CORRELATION COEFFICIENTS / PROB > \R\ UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
STEM_DEN	1.00000	0.16235	0.15008	0.16957	0.10659	0.23934	0.89494	0.92701	0.66858	0.25814	0.04718
	0.0000	0.0001	0.0001	0.0001	0.0028	0.0001	0.0001	0.0001	0.0001	0.0001	0.2811
	1621	1621	1621	1526	783	720	179	179	406	405	524
CRAB_B	0.16235	1.00000	0.32315	-0.02656	0.00046	0.17656	-0.02889	-0.03120	0.52670	0.28361	0.01463
	0.0001	0.0000	0.0001	0.2998	0.9898	0.0001	0.7010	0.6784	0.0001	0.0001	0.7383
	1621	1621	1621	1526	783	720	179	179	406	405	524
ELEV	0.15008	0.32315	1.00000	0.44443	0.52543	0.05372	0.86251	0.92688	0.22251	0.17880	0.47991
	0.0001	0.0001	0.0000	0.0001	0.0001	0.1499	0.0001	0.0001	0.0001	0.0003	0.0001
	1621	1621	1621	1526	783	720	179	179	406	405	524
COND	0.16957	-0.02656	0.44443	1.00000	0.74207	0.00000	0.92427	0.92428	0.61486	0.61560	0.62617
	0.0001	0.2998	0.0001	0.0000	0.0001	1.0000	0.0001	0.0001	0.0001	0.0001	0.0001
	1526	1526	1526	1526	764	654	179	179	390	390	507
SHOOT_HT	0.10659	0.00046	0.52543	0.74207	1.00000	0.00000	0.83995	0.87109	0.58146	0.77954	0.80745
	0.0028	0.9898	0.0001	0.0001	0.0000	1.0000	0.0001	0.0001	0.0001	0.0001	0.0001
	783	783	783	764	783	343	167	167	247	247	524

SPECIES=3

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
FL_STM	0.23934	0.17656	0.05372	0.00000	0.00000	1.00000	0.00000	0.00000	0.06998	0.34115	0.00000
	0.0001	0.0001	0.1499	1.0000	1.0000	0.0000	1.0000	1.0000	0.2055	0.0001	1.0000
	720	720	720	654	343	720	179	179	329	328	264
SURVIVAL	0.89494	-0.02889	0.86251	0.92427	0.83995	0.00000	1.00000	0.98458	0.81792	0.90769	0.83229
	0.0001	0.7010	0.0001	0.0001	0.0001	1.0000	0.0000	0.0001	0.0001	0.0001	0.0001
	179	179	179	179	167	179	179	179	84	84	89
SURV_T	0.92701	-0.03120	0.92658	0.92428	0.87109	0.00000	0.98458	1.00000	0.81209	0.90391	0.87818
	0.0001	0.6784	0.0001	0.0001	0.0001	1.0000	0.0001	0.0000	0.0001	0.0001	0.0001
	179	179	179	179	167	179	179	179	84	84	89
RT_BIO	0.66858	0.52670	0.22251	0.61486	0.58146	0.06998	0.81792	0.81209	1.00000	0.39486	0.60955
	0.0001	0.0001	0.0001	0.0001	0.0001	0.2055	0.0001	0.0001	0.0000	0.0001	0.0001
	406	406	406	390	247	329	84	84	406	405	247
AIR_B	0.25814	0.28361	0.17880	0.81560	0.77954	0.34115	0.90769	0.90391	0.39486	1.00000	0.52797
	0.0001	0.0001	0.0003	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0001
	405	405	405	390	247	328	84	84	405	405	247
BASAL_AR	0.04718	0.01463	0.47991	0.62617	0.80745	0.00000	0.83229	0.87818	0.60955	0.52797	1.00000
	0.2811	0.7383	0.0001	0.0001	0.0001	1.0000	0.0001	0.0001	0.0001	0.0001	0.0000
	524	524	524	507	524	264	89	89	247	247	524

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   15:11 MONDAY, APRIL 17, 1978   67

SPECIES=4

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
STEM_DEN	1622	46.30949445	371.52381966	75114.01000000	0	8100.00000000
CRAB_B	1623	2.16087492	12.21675300	3507.10000000	0	200.00000000
ELEV	1624	0.43925493	0.76020260	713.35000000	0	4.81000000
COND	1499	0.22414943	0.89676983	336.00000000	0	9.00000000
SHOOT_HT	776	3.57860825	11.57456638	2777.00000000	0	84.00000000
FL_STM	720	1.24013889	17.23140428	892.90000000	0	330.00000000
SURVIVAL	174	9.05747126	20.52031635	1576.00000000	0	90.00000000
SURV_T	174	0.15798179	0.31268269	27.48883061	0	1.24904577
RT_BIO	407	38.62088452	303.21444805	15718.70000000	0	4180.00000000
AIR_B	404	42.17920792	289.09187145	17040.40000000	0	3070.00000000
BASAL_AR	519	0.21160116	0.74976176	109.82100000	0	6.59000000

CORRELATION COEFFICIENTS / PROB > \R\ UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
STEM_DEN	1.00000	0.22017	0.24314	0.40122	0.27931	0.08261	0.30917	0.34284	0.40210	0.64850	0.26521
	0.0000	0.0001	0.0001	0.0001	0.0001	0.0266	0.0001	0.0001	0.0001	0.0001	0.0001
	1622	1622	1622	1499	776	720	174	174	407	404	519
CRAB_B	0.22017	1.00000	0.29725	-0.01856	0.18724	-0.00415	0.21464	0.20765	0.32847	0.66939	0.13147
	0.0001	0.0000	0.0001	0.4727	0.0001	0.9114	0.0045	0.0060	0.0001	0.0001	0.0027
	1622	1623	1623	1499	776	720	174	174	407	404	519
ELEV	0.24314	0.29725	1.00000	0.49133	0.67116	0.12056	0.70443	0.79863	0.26356	0.29761	0.61555
	0.0001	0.0001	0.0000	0.0001	0.0001	0.0012	0.0001	0.0001	0.0001	0.0001	0.0001
	1622	1623	1624	1499	776	720	174	174	407	404	519
COND	0.40122	-0.01856	0.49133	1.00000	0.81466	0.27301	0.72034	0.76633	0.64209	0.65899	0.80822
	0.0001	0.4727	0.0001	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
	1499	1499	1499	1499	743	637	168	168	390	390	493
SHOOT_HT	0.27931	0.18724	0.67116	0.81466	1.00000	0.00000	0.75759	0.83653	0.62814	0.65417	0.89374
	0.0001	0.0001	0.0001	0.0001	0.0000	1.0000	0.0001	0.0001	0.0001	0.0001	0.0001
	776	776	776	743	776	333	159	159	243	241	519

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SPECIES=4

CORRELATION COEFFICIENTS / PROB > |R| UNDER H0:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
FL_STM	0.63261	-0.00415	0.12056	0.27301	0.00000	1.00000	0.00000	0.00000	0.00321	0.00554	0.00000
	0.0266	0.9114	0.0012	0.0001	1.0000	0.0000	1.0000	1.0000	0.9538	0.9203	1.0000
	720	720	720	637	333	720	174	174	329	328	258
SURVIVAL	0.39917	0.21464	0.70443	0.72034	0.75759	0.00000	1.00000	0.97931	0.91946	0.89148	0.50464
	0.0001	0.0045	0.0001	0.0001	0.0001	1.0000	0.0000	0.0001	0.0001	0.0001	0.0001
	174	174	174	168	159	174	174	174	80	80	84
SURV_T	0.34284	0.20765	0.79863	0.78633	0.83653	0.00000	0.97931	1.00000	0.93860	0.90124	0.58204
	0.0001	0.0060	0.0001	0.0001	0.0001	1.0000	0.0001	0.0000	0.0001	0.0001	0.0001
	174	174	174	168	159	174	174	174	80	80	84
RT_BIO	0.43210	0.32847	0.26356	0.64209	0.62814	0.00321	0.91946	0.93860	1.00000	0.76661	0.85811
	0.0001	0.0001	0.0001	0.0001	0.0001	0.9538	0.0001	0.0001	0.0000	0.0001	0.0001
	407	407	407	390	243	329	80	80	407	404	241
AIR_B	0.64850	0.66939	0.29761	0.65899	0.65417	0.00554	0.89148	0.90124	0.76661	1.00000	0.78525
	0.0001	0.0001	0.0001	0.0001	0.0001	0.9203	0.0001	0.0001	0.0001	0.0000	0.0001
	404	404	404	390	241	328	80	80	404	404	241
BASAL_AR	0.26521	0.13147	0.61555	0.80822	0.89374	0.00000	0.50464	0.58204	0.85811	0.78525	1.00000
	0.0001	0.0027	0.0001	0.0001	0.0001	1.0000	0.0001	0.0001	0.0001	0.0001	0.0000
	519	519	519	493	519	258	84	84	241	241	519

SPECIES=5

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
STEM_DEN	1621	20.11597779	92.34556743	32608.00000000	0	1370.00000000
CRAB_B	1621	2.86637878	14.08433325	4646.40000000	0	205.50000000
ELEV	1623	0.54849045	0.76928341	890.20000000	0	2.24200000
COND	1361	0.69581190	1.62292087	947.00000000	0	9.00000000
SHOOT_HT	761	8.26281209	14.73044813	6288.00000000	0	91.00000000
FL_STM	720	0.51861111	5.14034610	373.40000000	0	100.00000000
SURVIVAL	171	17.10526316	33.71664847	2925.00000000	0	295.00000000
SURV_T	168	0.24304923	0.34637863	40.83227049	0	1.36943841
RT_BIO	364	58.64725275	387.66676656	21347.60000000	0	7000.00000000
AIR_B	366	53.92377049	218.29328294	19736.10000000	0	3572.00000000
BASAL_AR	483	1.06090269	1.94080116	512.41600000	0	12.82000000

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
STEM_DEN	1.00000	0.15466	0.19431	0.48730	0.43254	0.58354	0.82838	0.69839	0.23562	0.56247	0.30831
	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
	1621	1621	1621	1360	759	720	170	167	362	364	481
CRAB_B	0.15466	1.00000	0.28739	-0.00418	0.26525	0.03803	0.09505	0.17355	0.04997	0.13066	0.20673
	0.0001	0.0000	0.0001	0.8775	0.0001	0.3081	0.2176	0.0249	0.3431	0.0126	0.0001
	1621	1621	1621	1360	759	720	170	167	362	364	481
ELEV	0.19431	0.28739	1.00000	0.63061	0.64384	0.05838	0.55941	0.81529	0.14769	0.19627	0.63829
	0.0001	0.0001	0.0000	0.0001	0.0001	0.1176	0.0001	0.0001	0.0049	0.0002	0.0001
	1621	1621	1623	1360	759	720	170	167	362	364	481
COND	0.48730	-0.00418	0.63061	1.00000	0.86034	0.24540	0.65318	0.87941	0.23631	0.77381	0.65209
	0.0001	0.8775	0.0001	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
	1360	1360	1360	1361	663	534	170	167	283	283	398
SHOOT_HT	0.43254	0.26525	0.64384	0.86034	1.00000	0.26411	0.65133	0.89243	0.17443	0.72446	0.82213
	0.0001	0.0001	0.0001	0.0001	0.0000	0.0001	0.0001	0.0001	0.0117	0.0001	0.0001
	759	759	759	663	761	535	169	166	208	208	483

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SPECIES=5

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
FL_STM	0.58354	0.03803	0.05838	0.24540	0.26411	1.00000	0.28382	0.30297	0.16838	0.39549	0.20133
	0.0001	0.3081	0.1176	0.0001	0.0001	0.0000	0.0002	0.0001	0.0034	0.0001	0.0015
	720	720	720	534	335	720	170	167	300	302	246
SURVIVAL	0.82838	0.09505	0.55941	0.65318	0.65133	0.28382	1.00000	0.98266	0.06068	0.77006	0.41583
	0.0001	0.2176	0.0001	0.0001	0.0001	0.0002	0.0000	0.0001	0.6050	0.0001	0.0001
	170	170	170	170	169	170	171	168	75	75	81
SURV_T	0.69839	0.17355	0.81529	0.87941	0.89243	0.30297	0.98266	1.00000	0.13325	0.79727	0.52070
	0.0001	0.0249	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.2611	0.0001	0.0001
	167	167	167	167	166	167	168	168	73	73	79
RT_BIO	0.23562	0.04997	0.14769	0.23631	0.17443	0.16838	0.06068	0.13325	1.00000	0.76698	0.62607
	0.0001	0.3431	0.0049	0.0001	0.0117	0.0034	0.6050	0.2611	0.0000	0.0001	0.0001
	362	362	362	283	208	300	75	73	364	363	196
AIR_B	0.56247	0.13066	0.19627	0.77381	0.72446	0.39549	0.77006	0.79727	0.76698	1.00000	0.65608
	0.0001	0.0126	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0001
	364	364	364	283	208	302	75	73	363	366	197
BASAL_AR	0.50831	0.20673	0.63829	0.65209	0.82213	0.20133	0.41583	0.52070	0.62607	0.65608	1.00000
	0.0001	0.0001	0.0001	0.0001	0.0001	0.0015	0.0001	0.0001	0.0001	0.0001	0.0000
	481	481	481	398	483	246	81	79	196	197	483

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   15:11 MONDAY, APRIL 17, 1978   71

SPECIES=6

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
STEM_DEN	1620	10.65370370	94.93006667	17259.00000000	0	3100.00000000
CRAB_B	1620	2.03123457	10.14176108	3290.60000000	0	120.00000000
ELEV	1620	0.46861420	0.76843266	759.15500000	0	2.37100000
COND	1436	0.27715877	0.99324927	398.00000000	0	9.00000000
SHOOT_HT	780	5.20512821	13.75800290	4060.00000000	0	97.00000000
FL_STM	720	0.09861111	1.53494239	71.00000000	0	30.00000000
SURVIVAL	175	7.65142857	20.11486228	1339.00000000	0	100.00000000
SURV_T	175	0.13782932	0.31189282	24.12013020	0	1.57079633
RT_BIO	380	32.13131579	134.93071590	12209.90000000	0	1221.00000000
AIR_B	380	31.39894737	136.89527495	11931.60000000	0	1500.00000000
BASAL_AR	517	0.71283946	1.80747913	368.53800000	0	11.97000000

CORRELATION COEFFICIENTS / PROB > \R\ UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_H	BASAL_AR
STEM_DEN	1.00000	0.08460	0.19704	0.56279	0.28495	0.02612	0.51657	0.62279	0.21888	0.34079	0.28162
	0.0000	0.0007	0.0001	0.0001	0.0001	0.4841	0.0001	0.0001	0.0001	0.0001	0.0001
	1620	1620	1620	1436	780	720	175	175	380	380	517
CRAB_H	0.08460	1.00000	0.30635	-0.02207	0.06032	0.04235	-0.00686	-0.00565	0.24784	0.14205	0.16940
	0.0007	0.0000	0.0001	0.4034	0.0923	0.2565	0.9282	0.9409	0.0001	0.0055	0.0001
	1620	1620	1620	1436	780	720	175	175	380	380	517
ELEV	0.19704	0.30635	1.00000	0.60490	0.72890	0.09704	0.69570	0.81260	0.44784	0.39449	0.73069
	0.0001	0.0001	0.0000	0.0001	0.0001	0.0092	0.0001	0.0001	0.0001	0.0001	0.0001
	1620	1620	1620	1436	780	720	175	175	380	380	517
COND	0.56279	-0.02207	0.60490	1.00000	0.75923	0.00000	0.60015	0.71816	0.34338	0.83346	0.69679
	0.0001	0.4034	0.0001	0.0000	0.0001	1.0000	0.0001	0.0001	0.0001	0.0001	0.0001
	1436	1436	1436	1436	711	590	173	173	335	335	450
SHOOT_HT	0.28495	0.06032	0.72890	0.75923	1.00000	0.21893	0.77287	0.79243	0.69096	0.65351	0.91425
	0.0001	0.0923	0.0001	0.0001	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
	780	780	780	711	780	346	168	168	224	224	517

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SPECIES=6

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEV	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
FL_STM	0.02612	0.04235	0.09704	0.00000	0.21893	1.00000	0.00000	0.00000	0.21030	0.32650	0.16410
	0.4841	0.2565	0.0092	1.0000	0.0001	0.0000	1.0000	1.0000	0.0001	0.0001	0.0075
	720	720	720	590	346	720	175	175	322	322	264
SURVIVAL	0.51657	-0.00686	0.69570	0.60015	0.67287	0.00000	1.00000	0.97923	0.50464	0.52465	0.31716
	0.0001	0.9282	0.0001	0.0001	0.0001	1.0000	0.0000	0.0001	0.0001	0.0001	0.0029
	175	175	175	173	168	175	175	175	82	82	86
SURV_T	0.62279	-0.00565	0.81260	0.71816	0.79243	0.00000	0.97923	1.00000	0.60782	0.62414	0.39818
	0.0001	0.9409	0.0001	0.0001	0.0001	1.0000	0.0001	0.0000	0.0001	0.0001	0.0001
	175	175	175	173	168	175	175	175	82	82	86
RT_BIO	0.21888	0.24784	0.44784	0.34338	0.69096	0.21030	0.50464	0.60782	1.00000	0.55738	0.77614
	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0001	0.0001
	380	380	380	335	224	322	82	82	380	380	224
AIR_B	0.34079	0.14205	0.39449	0.83346	0.65351	0.32650	0.52465	0.62414	0.55738	1.00000	0.71205
	0.0001	0.0055	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000	0.0001
	380	380	380	335	224	322	82	82	380	380	224
BASAL_AR	0.28162	0.16940	0.73069	0.69679	0.91425	0.16410	0.31716	0.39818	0.77614	0.71205	1.00000
	0.0001	0.0001	0.0001	0.0001	0.0001	0.0075	0.0029	0.0001	0.0001	0.0001	0.0000
	517	517	517	450	517	264	86	86	224	224	517

AD-A062 867 GEORGIA UNIV BRUNSWICK MARINE EXTENSION SERVICE F/G 13/2
HABITAT DEVELOPMENT FIELD INVESTIGATIONS BUTTERMILK SOUND MARSH--ETC(U)
JUL 78 R J REIMOLD, M A HARDISKY, P C ADAMS DACW21-75-C-0074
UNCLASSIFIED WES-TR-D-78-26-APP-A NL

15 OF 16
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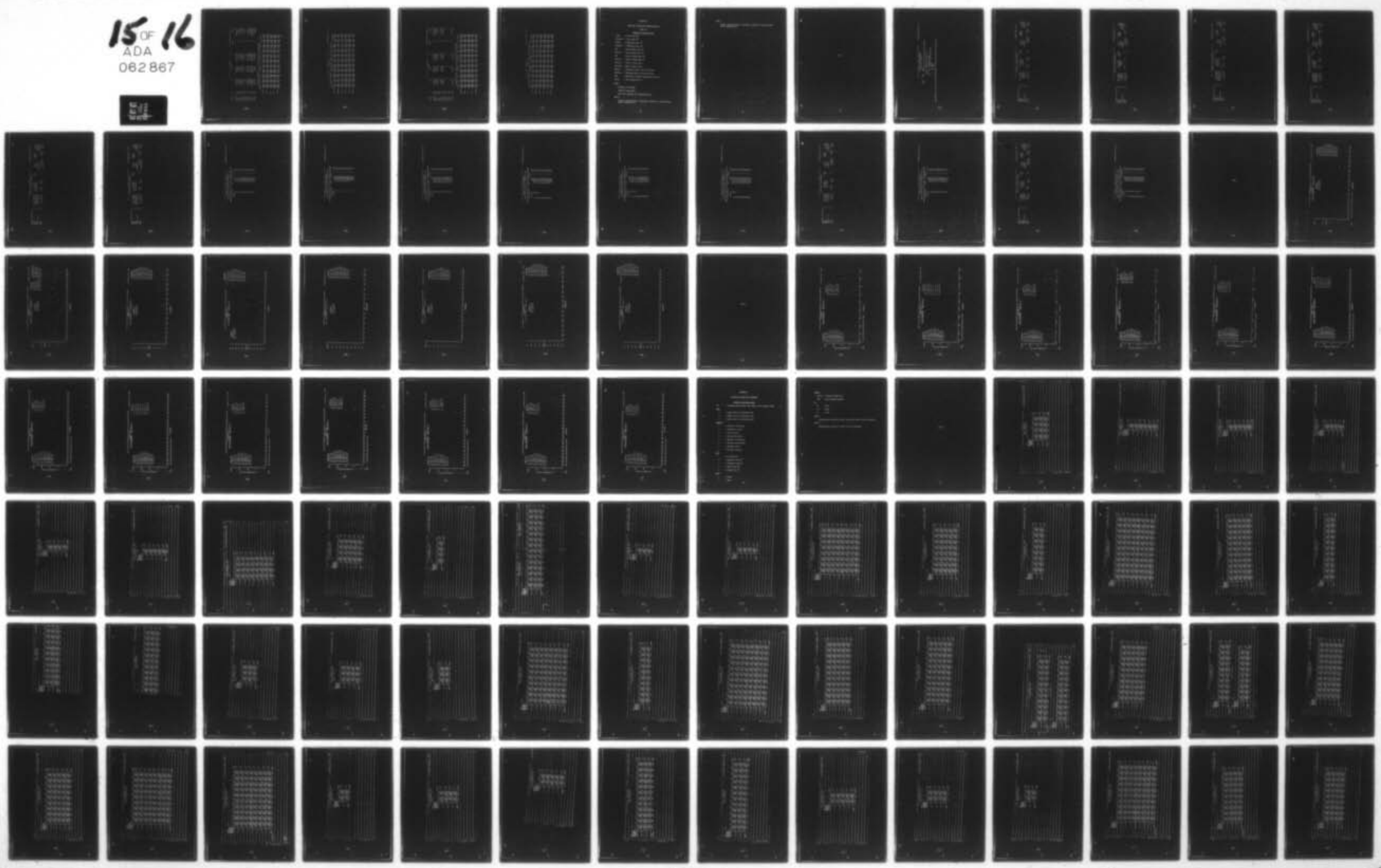

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S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   15:11 MONDAY, APRIL 17, 1978   73

SPECIES=7

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
STEM_DEN	1621	203.84268970	1035.95149884	330429.00000000	0	12700.00000000
CRAB_B	1621	3.83824800	24.08408404	6221.80000000	0	400.00000000
ELEV	1621	0.44436459	0.76049752	720.31500000	0	2.52000000
COND	1493	0.36771601	1.19626427	549.00000000	0	9.00000000
SHOOT_HT	767	3.88526728	11.20191514	2980.00000000	0	95.00000000
FL_STM	720	0	0	0	0	0
SURVIVAL	178	26.92696629	79.80867130	4793.00000000	0	582.00000000
SURV_T	164	0.12852901	0.31423489	21.07875769	0	1.57079633
RT_BIO	410	193.26804878	838.71125276	79239.90000000	0	8650.00000000
AIR_B	410	119.76487805	528.82580054	49103.60000000	0	6627.00000000
BASAL_AR	500	0.22127600	0.72254046	110.63800000	0	6.27000000

CORRELATION COEFFICIENTS / PROB > \R\ UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
STEM_DEN	1.00000 0.0000 1621	0.31308 0.0001 1621	0.40005 0.0001 1621	0.33804 0.0001 1492	0.46264 0.0001 767	0.00000 1.0000 720	0.99095 0.0001 178	0.83786 0.0001 164	0.77361 0.0001 409	0.57451 0.0001 409	0.40748 0.0001 500
CRAB_B	0.31308 0.0001 1621	1.00000 0.0000 1621	0.29842 0.0001 1621	-0.01820 0.4925 1492	0.21022 0.0001 767	0.00000 1.0000 720	0.00302 0.9681 178	0.14219 0.0693 164	0.51487 0.0001 409	0.72710 0.0001 409	0.14445 0.0012 500
ELEV	0.40005 0.0001 1621	0.29842 0.0001 1621	1.00000 0.0000 1621	0.68270 0.0001 1492	0.75333 0.0001 767	0.00000 1.0000 720	0.68760 0.0001 178	0.92058 0.0001 164	0.42544 0.0001 409	0.42631 0.0001 409	0.66420 0.0001 500
COND	0.33804 0.0001 1492	-0.01820 0.4825 1492	0.68270 0.0001 1492	1.00000 0.0000 1493	0.92118 0.0001 739	0.00000 1.0000 623	0.67153 0.0001 178	0.87561 0.0001 164	0.42815 0.0001 376	0.42643 0.0001 376	0.65454 0.0001 472
SHOOT_HT	0.46264 0.0001 767	0.21022 0.0001 767	0.75333 0.0001 767	0.92118 0.0001 739	1.00000 0.0000 767	0.00000 1.0000 339	0.59697 0.0001 177	0.92565 0.0001 163	0.67799 0.0001 241	0.62777 0.0001 241	0.81081 0.0001 499

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SPECIES=7

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
FL_STM	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
	720	720	720	623	339	720	178	164	337	337	250
SURVIVAL	0.99095	0.00302	0.68760	0.67153	0.59697	0.00000	1.00000	0.99135	0.67823	0.75550	0.72109
	0.0001	0.9681	0.0001	0.0001	0.0001	1.0000	0.0000	0.0001	0.0001	0.0001	0.0001
	178	178	178	178	177	178	178	164	85	85	88
SURV_T	0.83786	0.14219	0.92058	0.87561	0.92565	0.00000	0.99135	1.00000	0.78322	0.52220	0.91265
	0.0001	0.0693	0.0001	0.0001	0.0001	1.0000	0.0001	0.0000	0.0001	0.0001	0.0001
	164	164	164	164	163	164	164	164	77	77	80
RT_BIO	0.77361	0.51487	0.42544	0.42815	0.67799	0.00000	0.67823	0.78322	1.00000	0.63306	0.69393
	0.0001	0.0001	0.0001	0.0001	0.0001	1.0000	0.0001	0.0001	0.0000	0.0001	0.0001
	409	409	409	376	241	337	85	77	410	410	241
AIR_B	0.57451	0.72710	0.42631	0.42643	0.82777	0.00000	0.75550	0.52220	0.63306	1.00000	0.84125
	0.0001	0.0001	0.0001	0.0001	0.0001	1.0000	0.0001	0.0001	0.0001	0.0000	0.0001
	409	409	409	376	241	337	85	77	410	410	241
BASAL_AR	0.40748	0.14445	0.66420	0.65454	0.81081	0.00000	0.72109	0.91265	0.69393	0.84125	1.00000
	0.0001	0.0012	0.0001	0.0001	0.0001	1.0000	0.0001	0.0001	0.0001	0.0001	0.0000
	500	500	500	472	499	250	88	80	241	241	500

SPECIES=8

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
STEM_DEN	1620	5.18333333	113.62975471	8397.00000000	0	4400.00000000
CRAB_B	1621	2.12344232	12.14163760	3442.10000000	0	230.00000000
ELEV	1622	0.33293588	0.68517720	540.02200000	0	2.79200000
COND	1590	0	0	0	0	0
SHOOT_HT	806	0.05210918	1.15817988	42.00000000	0	31.00000000
FL_STM	720	0.04166667	1.11803399	30.00000000	0	30.00000000
SURVIVAL	180	0	0	0	0	0
SURV_T	180	0	0	0	0	0
RT_BIO	436	0	0	0	0	0
AIR_B	436	0	0	0	0	0
BASAL_AR	536	0.01011940	0.18862909	5.42400000	0	4.19200000

CORRELATION COEFFICIENTS / PROB > \R\ UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
STEM_DEN	1.00000	0.02530	0.09237	0.00000	0.98727	0.16778	0.00000	0.00000	0.00000	0.00000	0.99453
	0.0000	0.3089	0.0002	1.0000	0.0001	0.0001	1.0000	1.0000	1.0000	1.0000	0.0001
	1620	1620	1620	1590	806	720	180	180	436	436	536
CRAB_B	0.02530	1.00000	0.35409	0.00000	0.15401	0.00177	0.00000	0.00000	0.00000	0.00000	0.17295
	0.3089	0.0000	0.0001	1.0000	0.0001	0.9623	1.0000	1.0000	1.0000	1.0000	0.0001
	1620	1621	1621	1590	806	720	180	180	436	436	536
ELEV	0.09237	0.35409	1.00000	0.00000	0.13121	0.01584	0.00000	0.00000	0.00000	0.00000	0.14660
	0.0002	0.0001	0.0000	1.0000	0.0002	0.6714	1.0000	1.0000	1.0000	1.0000	0.0007
	1620	1621	1622	1590	806	720	180	180	436	436	536
COND	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
	1590	1590	1590	1590	804	701	180	180	436	436	534
SHOOT_HT	0.98727	0.15401	0.13121	0.00000	1.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.99848
	0.0001	0.0001	0.0002	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0001
	806	806	806	804	806	357	180	180	265	265	536

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SPECIES=F

CORRELATION COEFFICIENTS / PROB > |R| UNDER H0:RHO=0 / NUMBER OF OBSERVATIONS

	STEM_DEN	CRAB_B	ELEV	COND	SHOOT_HT	FL_STM	SURVIVAL	SURV_T	RT_BIO	AIR_B	BASAL_AR
FL_STM	0.16778	0.00177	0.01594	0.00000	0.00000	1.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	0.0001	0.9623	0.6714	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
	720	720	720	701	357	720	180	180	346	346	267
SURVIVAL	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
	180	180	180	180	180	180	180	180	90	90	90
SURV_T	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
	180	180	180	180	180	180	180	180	90	90	90
RT_BIO	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
	436	436	436	436	265	346	90	90	436	436	265
AIR_B	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
	436	436	436	436	265	346	90	90	436	436	265
BASAL_AR	0.99453	0.17295	0.14660	0.00000	0.99848	0.00000	0.00000	0.00000	0.00000	0.00000	1.00000
	0.0001	0.0001	0.0007	1.0000	0.0001	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
	536	536	536	534	536	267	90	90	265	265	536

APPENDIX G

SPARTINA ALTERNIFLORA TRANSPLANTATION

PARTS 1-2

Legend for Variable Codes

C_den	=	Live culms $/m^2$
Culm_den	=	Live culms $/m^2$
Flower	=	Flowering culms $/m^2$
Flower_C	=	Flowering culms $/m^2$
Mom	=	Root biomass gdw $/m^2$
Mom_bio	=	Root biomass gdw $/m^2$
Aer	=	Aerial biomass gdw $/m^2$
Aer_bio	=	Aerial biomass gdw $/m^2$
root_sh	=	Root to shoot ratio
root_sho	=	Root to shoot ratio
Mature	=	Flowering culm to live culm ratio
Maturity	=	Flowering culm to live culm ratio
elev	=	Elevation in meters above mean low water
soil_T	=	Soil temperature C^o

PART 1

Analysis of Variance

General Linear Model

Data from November 1977 sampling period

PART 2

Graphic representation of dependent variables by sampling date versus planting date.

PART 3

Graphic representation of dependent variables by planting date versus sampling date.

PART 1

STATISTICAL ANALYSIS SYSTEM   1:28 SUNDAY, MARCH 5, 1978   1

GENERAL LINEAR MODELS PROCEDURE

CLASS LEVEL INFORMATION

CLASS	LEVELS	VALUES
DATE	13	126 156 188 218 249 281 319 335 373 405 429 460 490

NUMBER OF OBSERVATIONS IN DATA SET = 91

GROUP	OBS	DEPENDENT VARIABLES
1	91	ELEV SOIL_T C_DEN FLOWER MOM AER
2	83	ROOT_SH
3	85	MATURE

NOTE: VARIABLES IN EACH GROUP ARE CONSISTENT WITH RESPECT TO THE PRESENCE OR ABSENCE OF MISSING VALUES.

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: ELEV

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	12	0.45272424	0.03772702	0.51	0.9019	0.072842	24.5685
ERROR	78	5.76241514	0.07387712		STD DEV		ELEV MEAN
CORRECTED TOTAL	90	6.21513938			0.27180345		1.10630769

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
DATE	12	0.45272424	0.51	0.9019	12	0.45272424	0.51	0.9019

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GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: SOIL_T

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	12	4739.53846154	394.96153846	99999.99	0.0000	1.000000	0.0000
ERROR	78	0.00000000	0.00000000		STD DEV		SOIL_T MEAN
CORRECTED TOTAL	90	4739.53846154			0.00000000		20.38461538

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
DATE	12	4739.53846154	.	.	12	4739.53846154	.	.

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: C_DEN

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	12	636963.55604396	53080.29633700	0.95	0.5049	0.127278	92.0206
ERROR	78	4367529.93142857	55993.97347985		STD DEV		C_DEN MEAN
CORRECTED TOTAL	90	5004493.48747253			236.63045763		257.14945055

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
DATE	12	636963.55604396	0.95	0.5049	12	636963.55604396	0.95	0.5049

G7

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: FLOWER

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	12	20538.28571429	1711.52380952	1.51	0.1385	0.188514	113.8495
ERROR	78	88410.00000000	1133.46153846		STD DEV		FLOWER MEAN
CORRECTED TOTAL	90	108948.28571429			33.66692054		29.57142857

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
DATE	12	20538.28571429	1.51	0.1385	12	20538.28571429	1.51	0.1385

STATISTICAL ANALYSIS SYSTEM 1:28 SUNDAY, MARCH 5, 1978 6

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: MOM

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	12	3577684.17032967	298140.34752747	1.83	0.0574	0.219734	118.7167
ERROR	78	12704196.11714286	162874.30919414		STD DEV		MOM MEAN
CORRECTED TOTAL	90	16281880.28747253			403.57689378		339.94945055

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
DATE	12	3577684.17032967	1.83	0.0574	12	3577684.17032966	1.83	0.0574

STATISTICAL ANALYSIS SYSTEM 1:28 SUNDAY, MARCH 5, 1978 7

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: AER

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	12	3798478.43384615	316539.86948718	1.52	0.1339	0.189793	134.6973
ERROR	78	16215268.80571428	207888.06161172		STD DEV		AER MEAN
CORRECTED TOTAL	90	20013747.23956044			455.94743295		338.49780220

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
DATE	12	3798478.43384615	1.52	0.1339	12	3798478.43384615	1.52	0.1339

G10

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE ELEV

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05 DF=78 MS=.0738771

GROUPING	MEAN	N	DATE
A	1.231286	7	405
A	1.204286	7	156
A	1.195571	7	319
A	1.184429	7	429
A	1.101857	7	281
A	1.097143	7	249
A	1.094857	7	490
A	1.084000	7	460
A	1.054571	7	373
A	1.049571	7	188
A	1.041571	7	335
A	1.030286	7	218
A	1.012571	7	126

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   1:28 SUNDAY, MARCH 5, 1978   9

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE SOIL_T

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=73   MS=0

GROUPING	MEAN	N	DATE
A	32.000000	7	188
B	29.000000	7	156
C	28.000000	7	218
D	25.000000	7	249
E	24.000000	7	490
F	23.000000	7	126
G	20.000000	7	281
H	19.000000	7	460
I	18.000000	7	429
J	17.000000	7	319
K	14.000000	7	335
L	9.000000	7	373
M	7.000000	7	405

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE C_DEN

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=78   MS=55994

GROUPING	MEAN	N	DATE
A	381.428571	7	460
A	344.285714	7	126
A	342.857143	7	405
A	338.571429	7	218
A	304.285714	7	249
A	301.285714	7	429
A	295.571429	7	493
A	221.457143	7	319
A	197.142857	7	373
A	171.600000	7	156
A	164.457143	7	281
A	147.142857	7	335
A	132.857143	7	188

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   1:28 SUNDAY, MARCH 5, 1978   11

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE FLOWER

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=78   MS=1133.46

GROUPING		MEAN	N	DATE
	A	67.142857	7	405
B	A	47.000000	7	429
B	A	37.142857	7	126
B	A	37.142857	7	460
B	A	34.571429	7	490
B		25.714286	7	218
B		25.714286	7	249
B		24.285714	7	373
B		22.857143	7	156
B		22.857143	7	188
B		22.857143	7	319
B		10.000000	7	335
B		7.142857	7	281

STATISTICAL ANALYSIS SYSTEM   1:28 SUNDAY, MARCH 5, 1978   12

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE MOM

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=76   MS=162874

GROUPING		MEAN	N	DATE
	A	857.600000	7	429
B	A	501.857143	7	373
B	A	488.285714	7	460
B	A	470.871429	7	126
B	A	425.285714	7	490
B		313.171429	7	319
B		284.514286	7	405
B		247.000000	7	218
B		207.900000	7	156
B		204.114286	7	249
B		170.885714	7	281
B		135.428571	7	335
B		112.428571	7	188

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   1:28 SUNDAY, MARCH 5, 1978   13

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE AER

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=78   MS=207988

GROUPING		MEAN	N	DATE
	A	906.142857	7	429
B	A	545.314286	7	319
B	A	441.171429	7	126
B	A	382.142857	7	373
B		350.714286	7	405
B		338.142857	7	218
B		316.285714	7	460
B		314.857143	7	490
B		214.857143	7	249
B		172.585714	7	281
B		161.714286	7	188
B		156.028571	7	335
B		100.514286	7	156

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: ROOT_SH

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	12	512.28227956	42.69018996	1.08	0.3889	0.156401	312.1418
ERROR	70	2763.15225999	39.47360371		STD DEV		ROOT_SH MEAN
CORRECTED TOTAL	82	3275.43453955			6.28280222		2.01280413

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
DATE	12	512.28227956	1.08	0.3889	12	512.28227956	1.08	0.3889

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE ROOT_SH

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=70   MS=39.4736

GROUPING	MEAN	N	DATE
A	10.783544	6	156
B	2.062280	7	126
B	1.949069	7	335
B	1.745402	7	319
B	1.551401	7	373
B	1.546561	6	460
B	1.273571	7	429
B	1.041885	5	188
B	0.980606	6	490
B	0.963396	7	281
B	0.956786	5	249
B	0.844371	6	405
B	0.760435	7	218

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: MATURE

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PR > F	R-SQUARE	C.V.
MODEL	12	0.11928809	0.00994067	1.02	0.4422	0.145042	86.2517
ERROR	72	0.70315246	0.00976601		STD DEV		MATURE MEAN
CORRECTED TOTAL	84	0.82244054			0.09882311		0.11457528

SOURCE	DF	TYPE I SS	F VALUE	PR > F	DF	TYPE IV SS	F VALUE	PR > F
DATE	12	0.11928809	1.02	0.4422	12	0.11928809	1.02	0.4422

GENERAL LINEAR MODELS PROCEDURE

DUNCAN'S MULTIPLE RANGE TEST FOR VARIABLE MATURE

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT.

ALPHA LEVEL=.05   DF=72   MS=0.009766

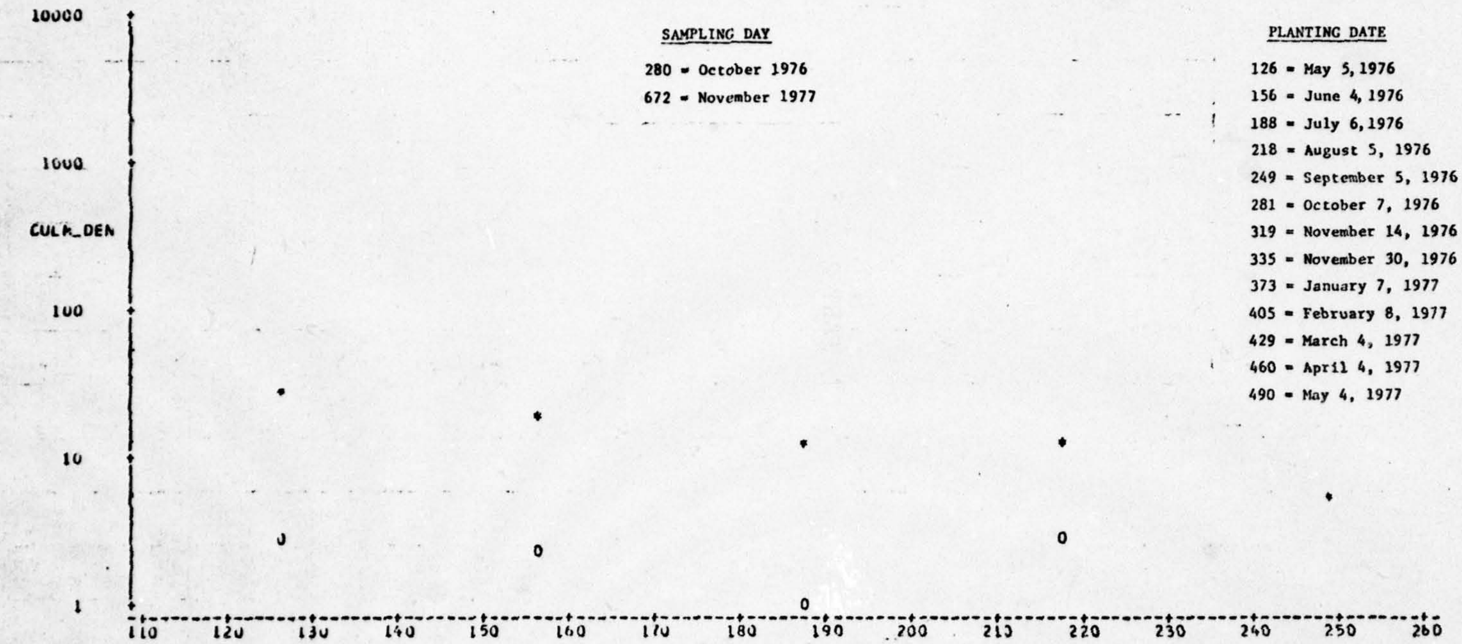
GROUPING		MEAN	N	DATE
	A	0.198215	7	405
B	A	0.159704	5	188
B	A	0.149454	6	429
B	A	0.144891	6	463
B	A	0.123564	7	490
B	A	0.116121	7	156
B	A	0.105744	7	373
B	A	0.102310	7	126
B	A	0.093268	5	249
B	A	0.092248	7	218
B	A	0.091364	7	319
B		0.069021	7	281
B		0.059694	7	335

PART 2

MEAN LIVE AND FLOWERING CULM DENSITY /M2 FOR S.ALTERNIFLORA TRANSPLANTS 1:39 SUNDAY, MARCH 5, 1978

SAMPLING DAY =280

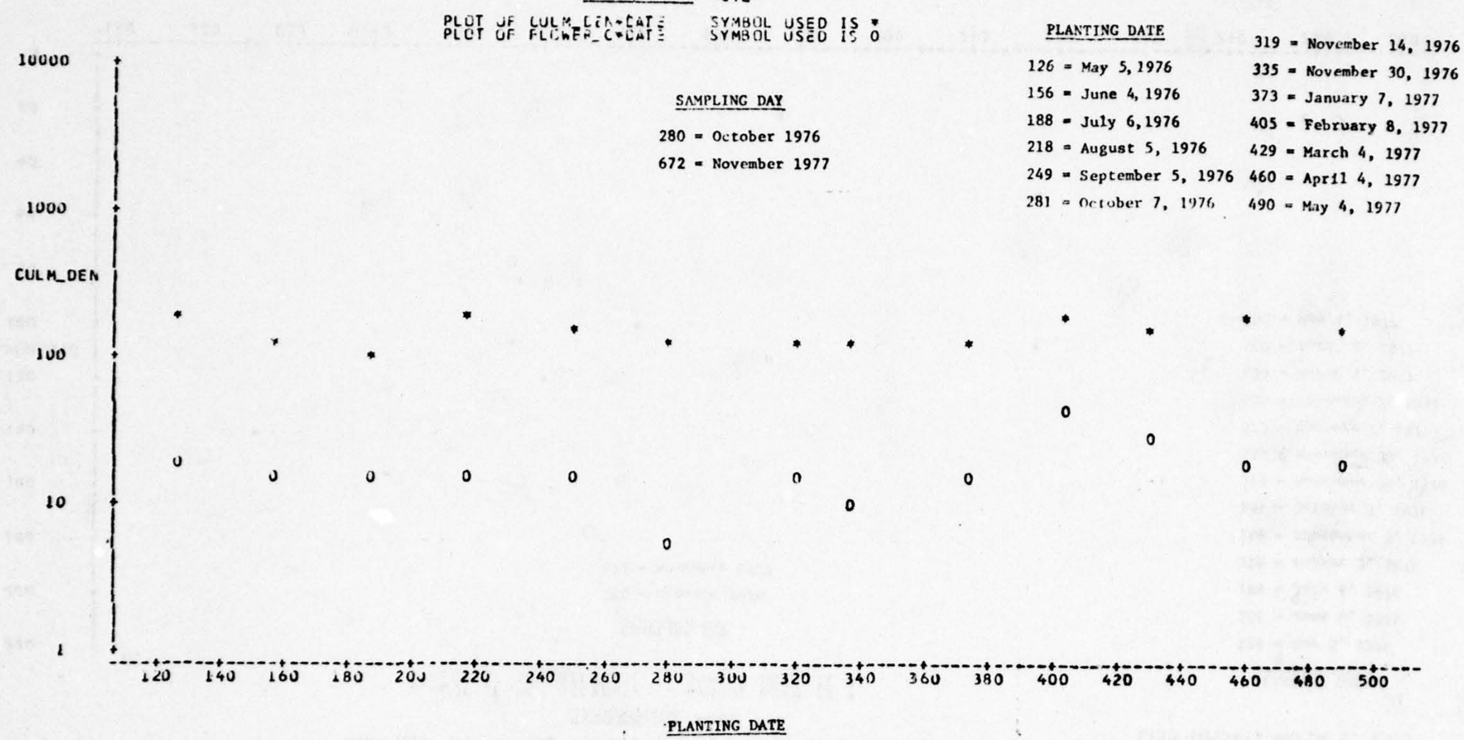
PLOT OF CULM_DEN*DATE SYMBOL USED IS *
PLOT OF FLOWER_C*DATE SYMBOL USED IS O



NOTE: 1 OBS HAD MISSING VALUES OR WERE OUT OF RANGE PLANTING DATE

MEAN LIVE AND FLOWERING CULM DENSITY /M2 FOR S.ALTERNIFLORA TRANSPLANTS   1:39 SUNDAY, MARCH 5, 1978

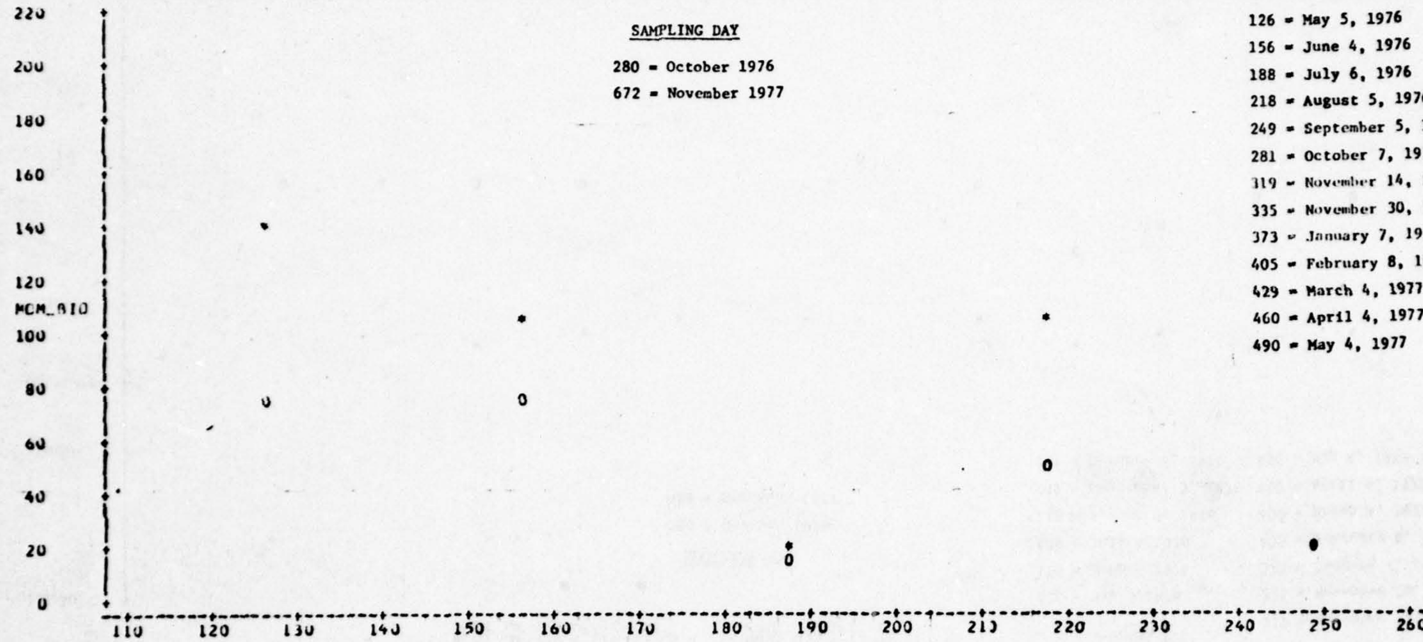
SAMPLING DAY =672



MEAN ROOT AND AERIAL BIOMASS GDW/M2 FOR S. ALTERNIFLORA TRANSPLANTS 1:39 SUNDAY, MARCH 5, 1978

SAMPLING DAY =280

PLOT OF MCM_BIO*DATE SYMBOL USED IS *
PLOT OF AER_BIO*DATE SYMBOL USED IS 0



PLANTING DATE

PLANTING DATE

126 = May 5, 1976
156 = June 4, 1976
188 = July 6, 1976
218 = August 5, 1976
249 = September 5, 1976
281 = October 7, 1976
319 = November 14, 1976
335 = November 30, 1976
373 = January 7, 1977
405 = February 8, 1977
429 = March 4, 1977
460 = April 4, 1977
490 = May 4, 1977

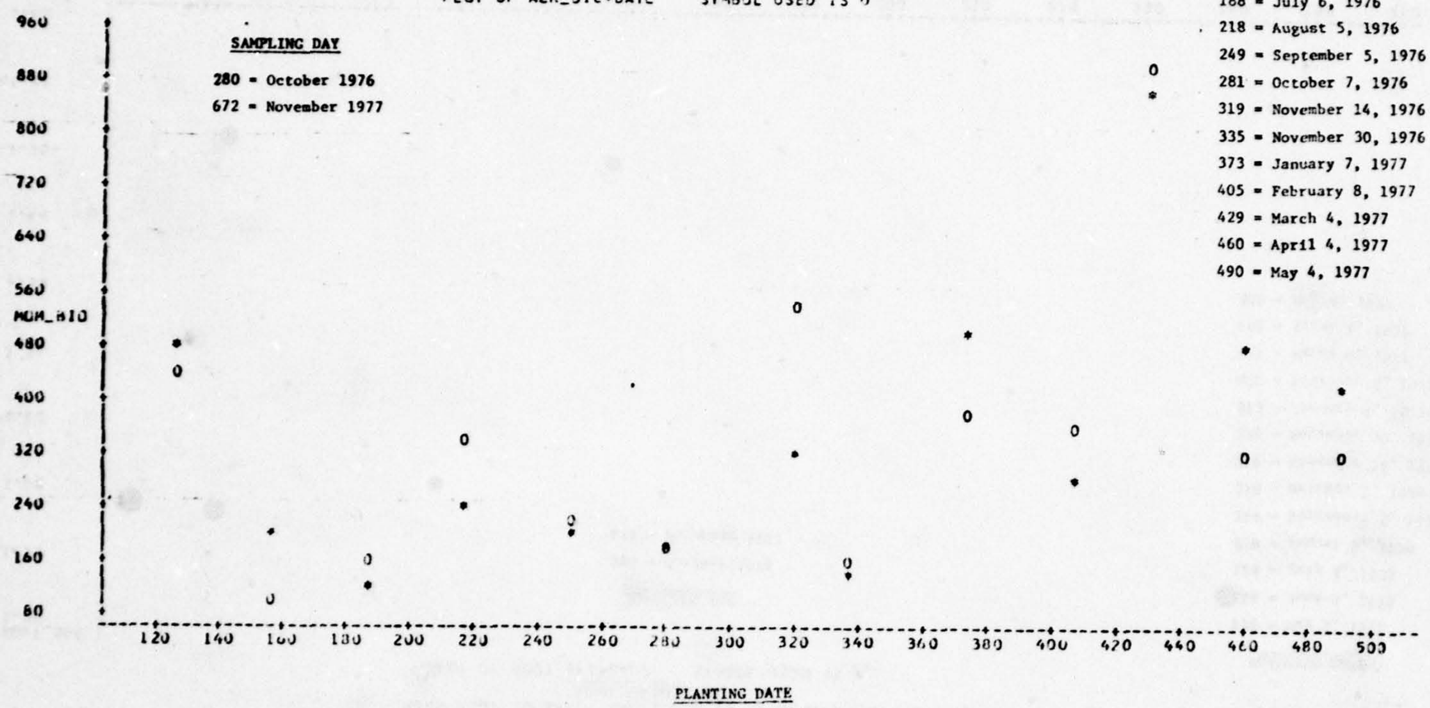
G24

MEAN ROOT AND AERIAL BIOMASS GDW/M2 FOR S. ALTERNIFLORA TRANSPLANTS

1:39

SAMPLING DAY =672

PLOT OF MOM_BIO*DATE   SYMBOL USED IS *
PLOT OF AER_BIO*DATE   SYMBOL USED IS 0



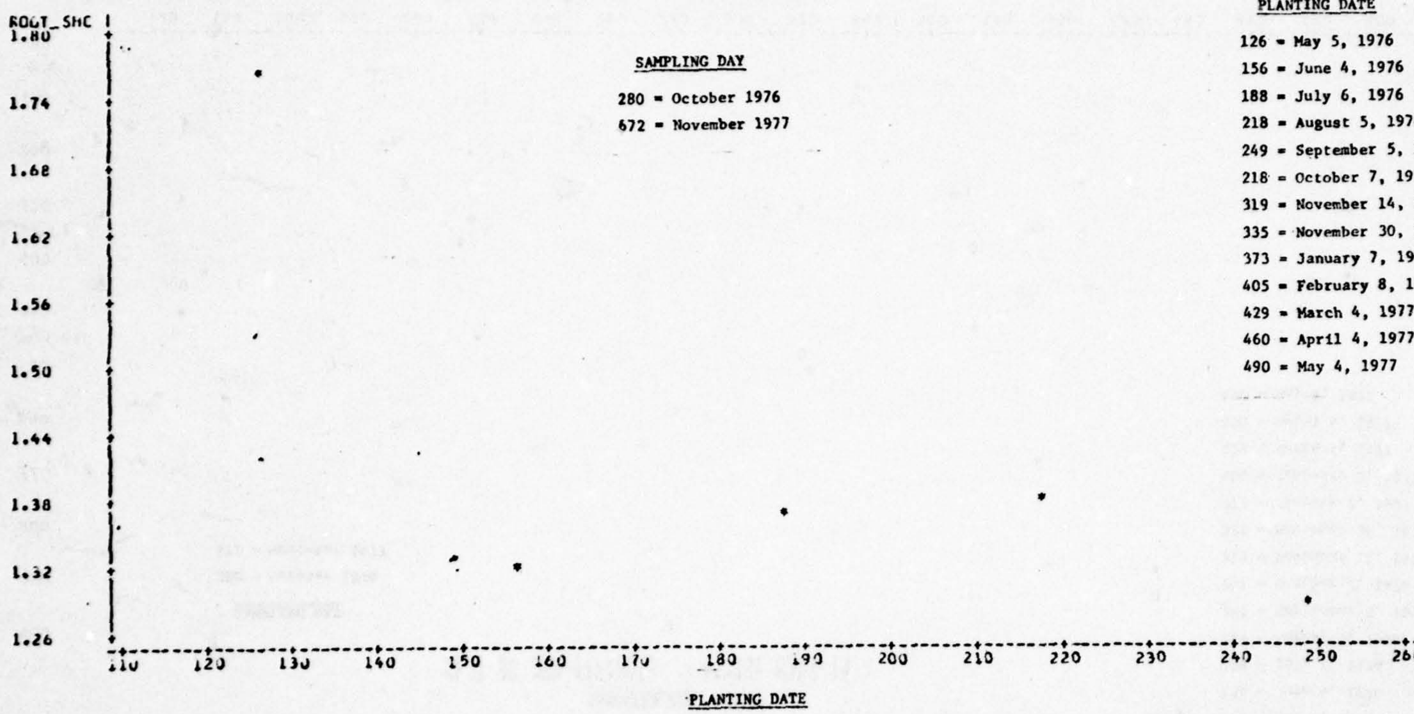
PLANTING DATE

126 = May 5, 1976
156 = June 4, 1976
188 = July 6, 1976
218 = August 5, 1976
249 = September 5, 1976
281 = October 7, 1976
319 = November 14, 1976
335 = November 30, 1976
373 = January 7, 1977
405 = February 8, 1977
429 = March 4, 1977
460 = April 4, 1977
490 = May 4, 1977

MEAN ROOT TO SHOOT RATIO FOR S. ALTERNIFLORA TRANSPLANTS 1:39 SUNDAY, MARCH 5, 1978 6

SAMPLING DAY =280

PLOT OF ROOT_SHC*DATE SYMBOL USED IS *



SAMPLING DAY

280 = October 1976
672 = November 1977

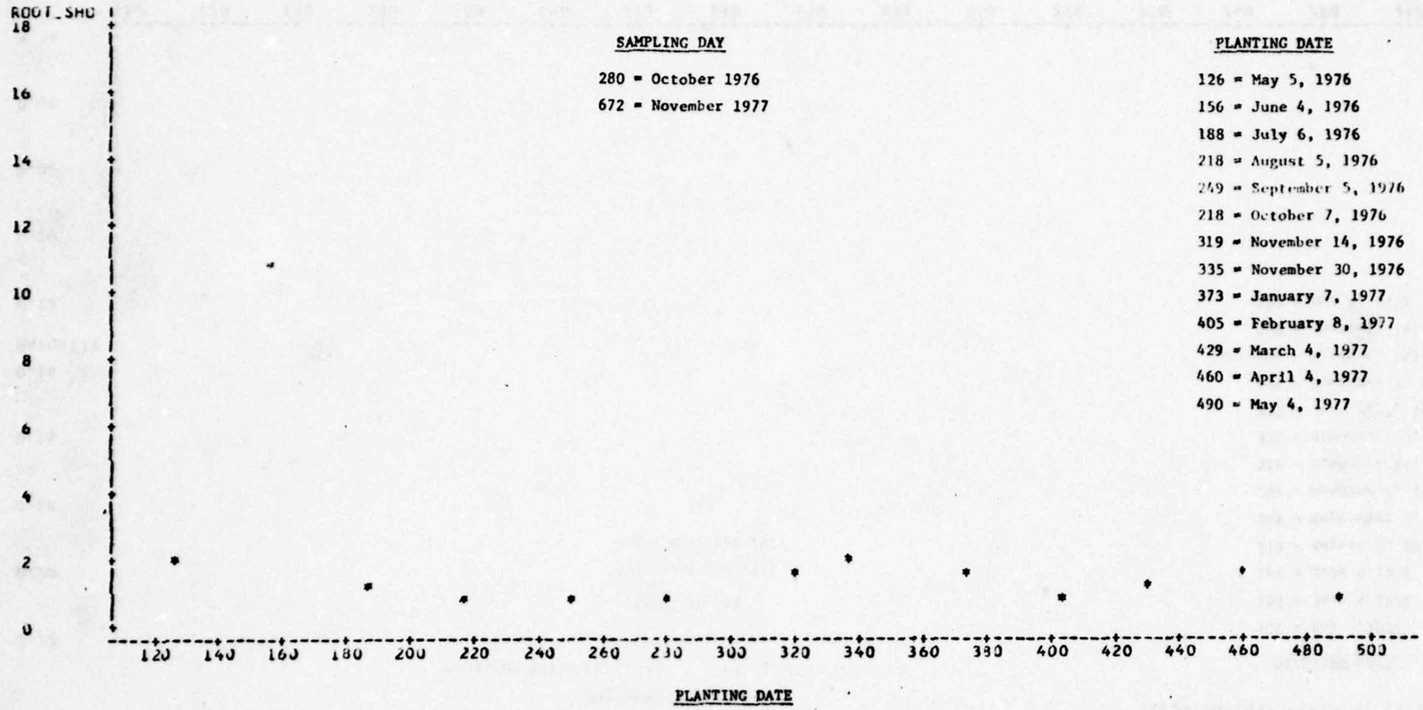
PLANTING DATE

126 = May 5, 1976
156 = June 4, 1976
188 = July 6, 1976
218 = August 5, 1976
249 = September 5, 1976
218 = October 7, 1976
319 = November 14, 1976
335 = November 30, 1976
373 = January 7, 1977
405 = February 8, 1977
429 = March 4, 1977
460 = April 4, 1977
490 = May 4, 1977

MEAN ROOT TO SHOOT RATIO FOR S. ALTERNIFLORA TRANSPLANTS 1:39 SUNDAY, MARCH 5, 1978 7

SAMPLING DAY =672

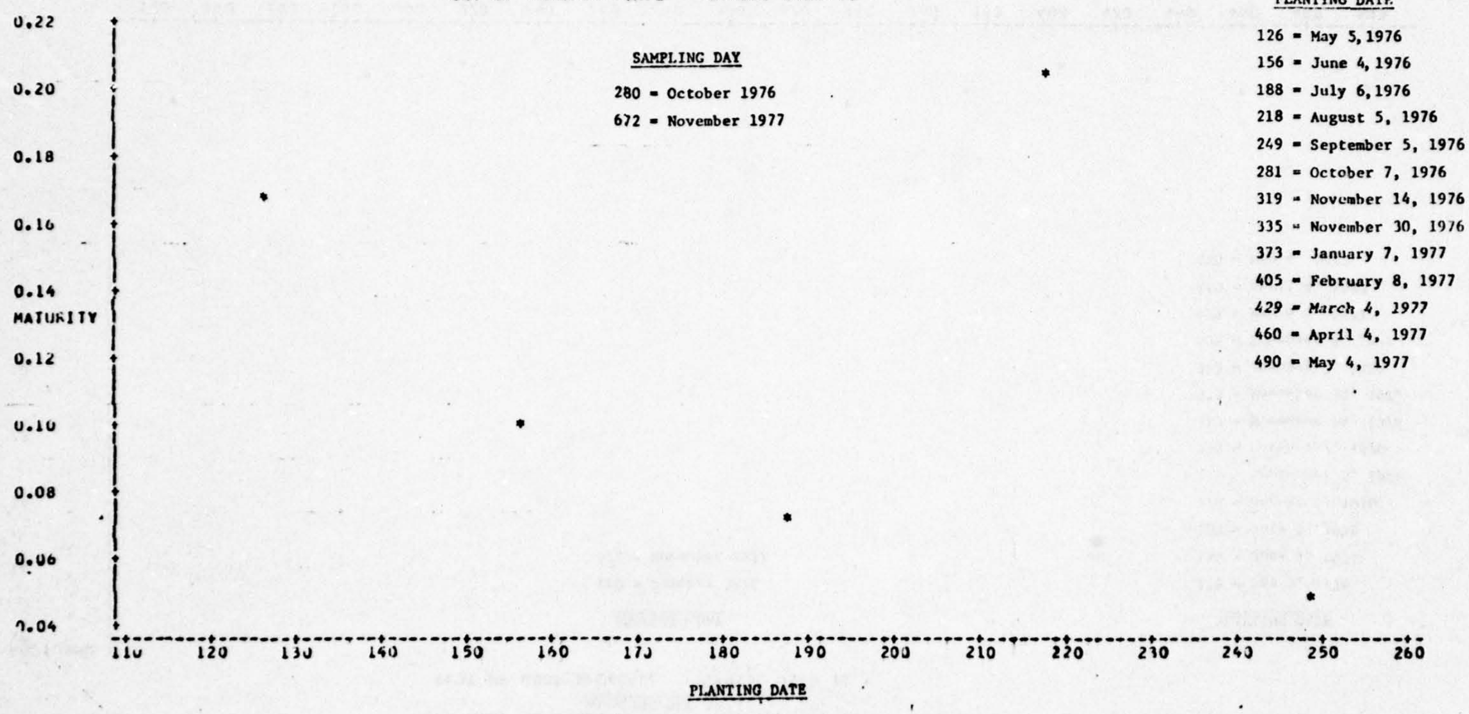
PLOT OF ROOT_SHO*DATE SYMBOL USED IS *



MEAN FLOWERING TO LIVE CULM DENSITY RATIO FOR S.ALTERNIFLORA TRANSPLANTS 1:39 SUNDAY, MARCH 5, 1978

SAMPLING DAY =280

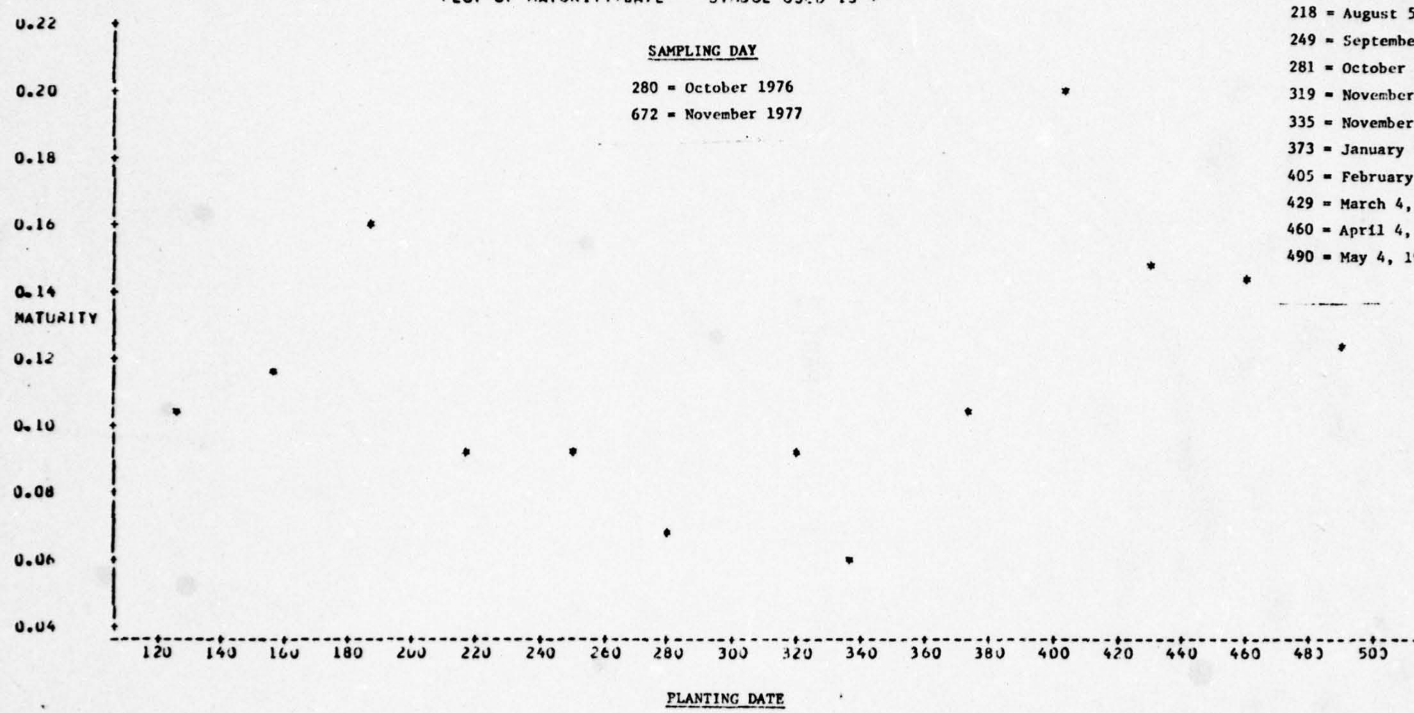
PLOT OF MATURITY*DATE SYMBOL USED IS *



MEAN FLOWERING TO LIVE CULM DENSITY RATIO FOR S.ALTERNIFLORA TRANSPLANTS 1:39 SUNDAY

SAMPLING DAY =672

PLOT OF MATURITY*DATE SYMBOL USED IS *



PLANTING DATE

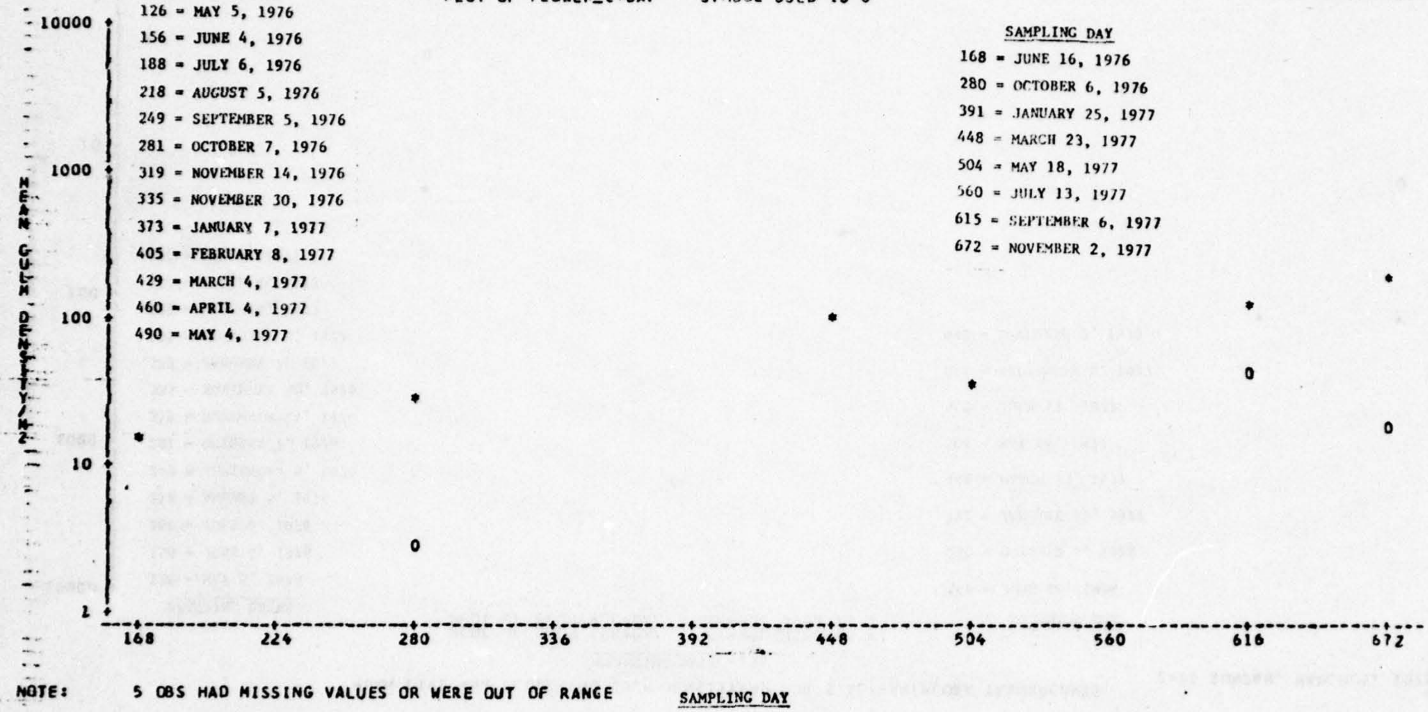
126 = May 5, 1976
156 = June 4, 1976
188 = July 6, 1976
218 = August 5, 1976
249 = September 5, 1976
281 = October 7, 1976
319 = November 14, 1976
335 = November 30, 1976
373 = January 7, 1977
405 = February 8, 1977
429 = March 4, 1977
460 = April 4, 1977
490 = May 4, 1977

PART 3

MEAN LIVE AND FLOWERING CULM DENSITY/M2 FOR S.ALTERNIFLORA TRANSPLANTS 2:25 SUNDAY, MARCH 5, 1978 3

PLANTING DATE =126

PLOT OF CUL4_DEN*DAY SYMBOL USED IS *
PLOT OF FLOWER_C*DAY SYMBOL USED IS 0



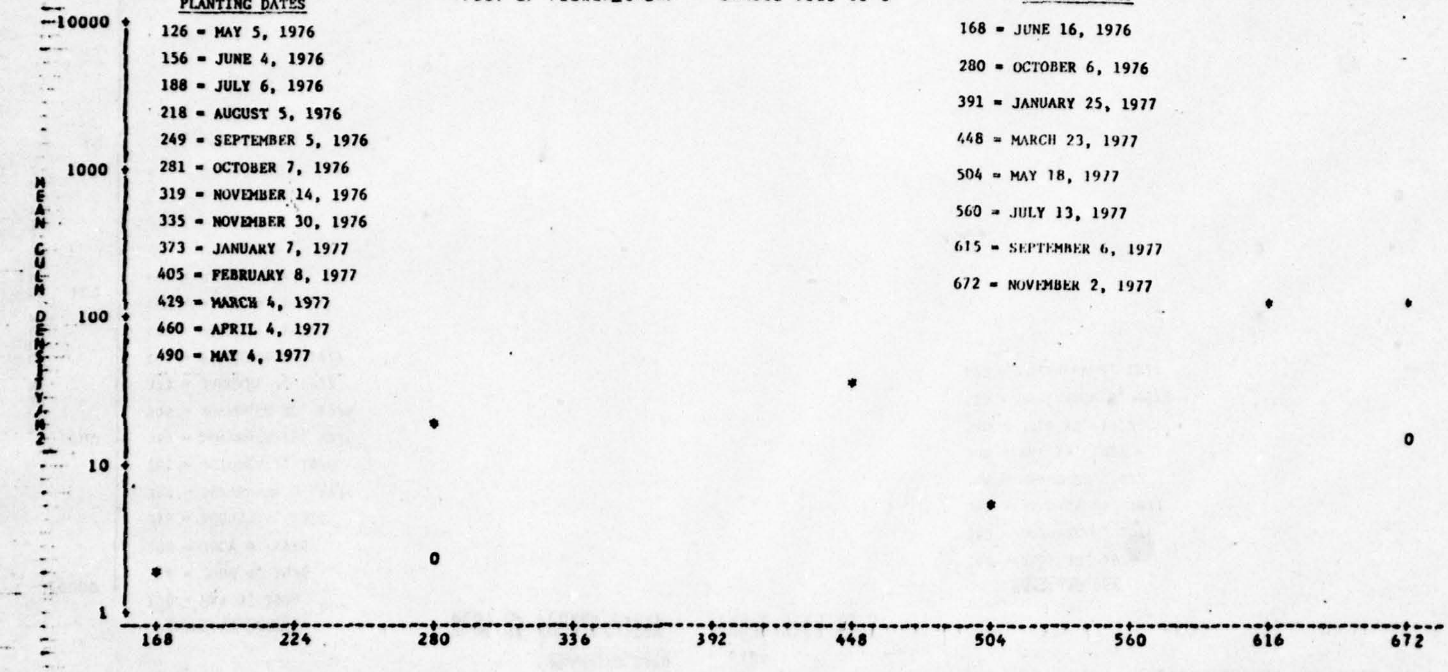
NOTE: 5 OBS HAD MISSING VALUES OR WERE OUT OF RANGE

MEAN LIVE AND FLOWERING CULM DENSITY/M2 FOR S.ALTERNIFLORA TRANSPLANTS

2:25 SUNDAY, MARCH 5, 1978 4

PLANTING DATE =156

PLOT OF CULM_DEN*DAY SYMBOL USED IS *
PLOT OF FLOWER_C*DAY SYMBOL USED IS O

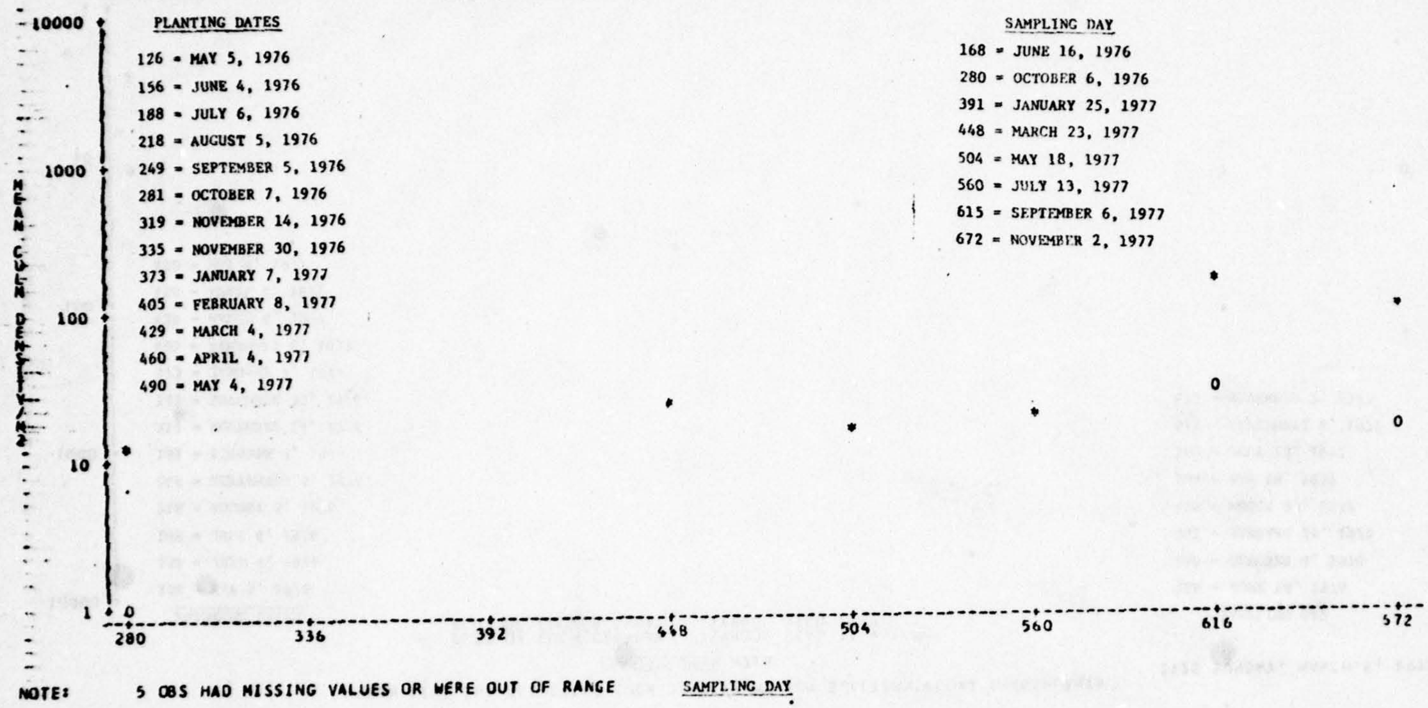


NOTE: 6 OBS HAD MISSING VALUES OR WERE OUT OF RANGE

MEAN LIVE AND FLOWERING CULM DENSITY/M2 FOR S.ALTERNIFLORA TRANSPLANTS 2:25 SUNDAY, MARCH 5, 1978 5

PLANTING DATE =188

PLOT OF CULM_DEN*DAY SYMBOL USED IS *
PLOT OF FLOWER_C*DAY SYMBOL USED IS 0

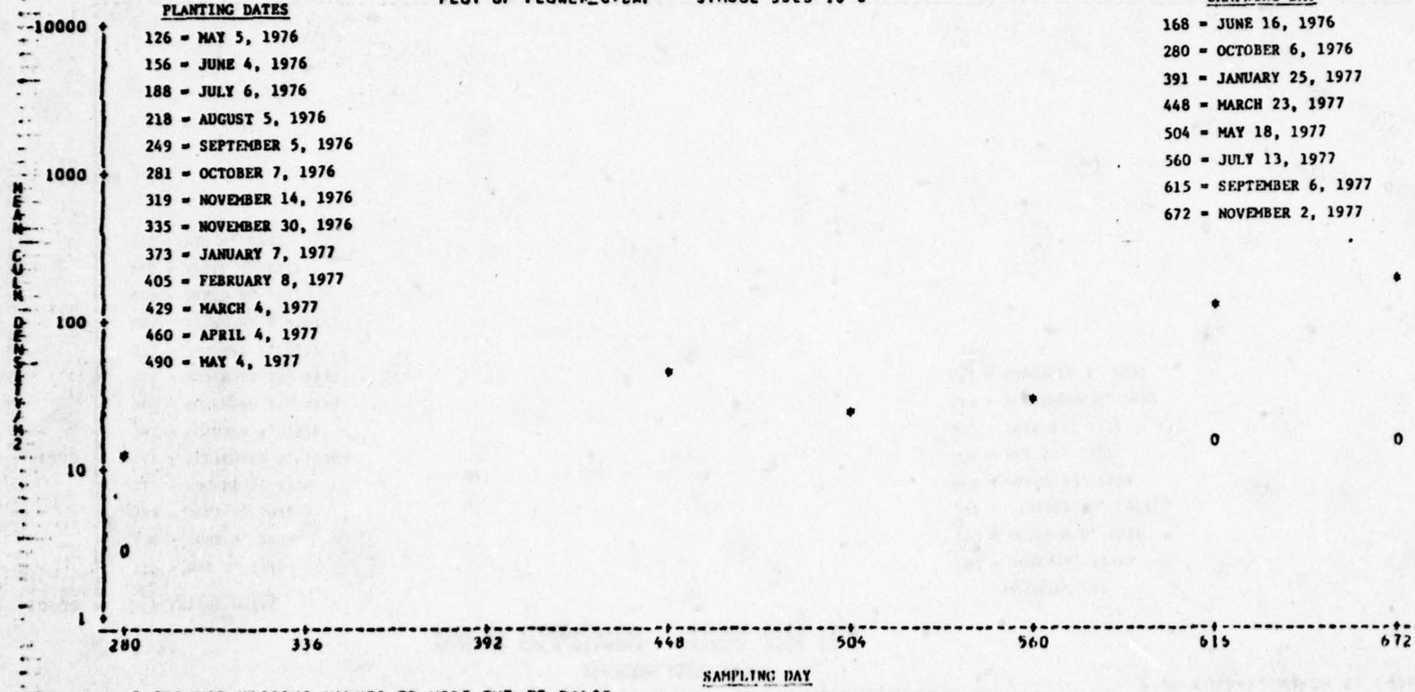


NOTE: 5 OBS HAD MISSING VALUES OR WERE OUT OF RANGE

MEAN LIVE AND FLOWERING CULM DENSITY/M2 FOR S.ALTERNIFLORA TRANSPLANTS 2:25 SUNDAY, MARCH 5, 1978 6

PLANTING DATE =218

PLOT OF CULM_DEN*DAY SYMBOL USED IS *
PLOT OF FLOWER_C*DAY SYMBOL USED IS 0



PLANTING DATES

126 = MAY 5, 1976
156 = JUNE 4, 1976
188 = JULY 6, 1976
218 = AUGUST 5, 1976
249 = SEPTEMBER 5, 1976
281 = OCTOBER 7, 1976
319 = NOVEMBER 14, 1976
335 = NOVEMBER 30, 1976
373 = JANUARY 7, 1977
405 = FEBRUARY 8, 1977
429 = MARCH 4, 1977
460 = APRIL 4, 1977
490 = MAY 4, 1977

SAMPLING DAY

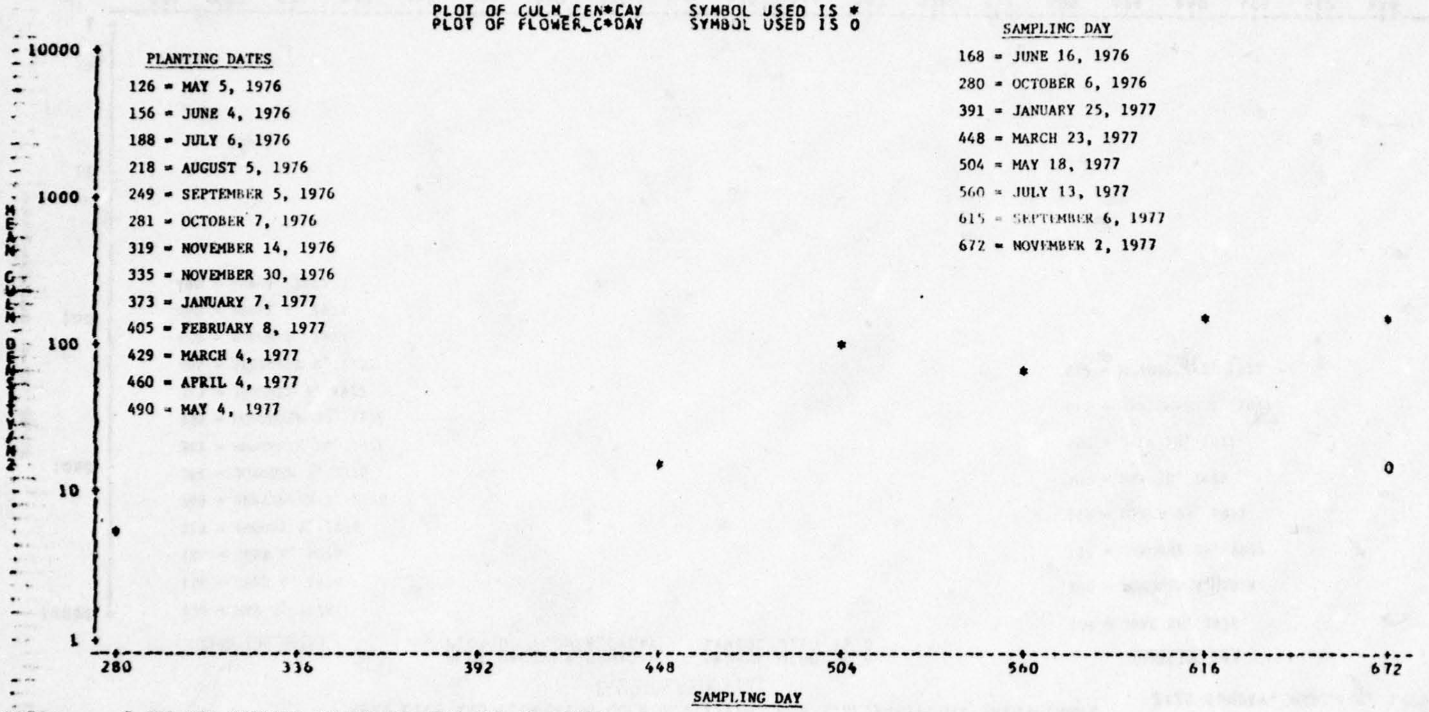
168 = JUNE 16, 1976
280 = OCTOBER 6, 1976
391 = JANUARY 25, 1977
448 = MARCH 23, 1977
504 = MAY 18, 1977
560 = JULY 13, 1977
615 = SEPTEMBER 6, 1977
672 = NOVEMBER 2, 1977

NOTE: 5 OBS HAD MISSING VALUES OR WERE OUT OF RANGE

MEAN LIVE AND FLOWERING CULM DENSITY/M2 FOR S.ALTERNIFLORA TRANSPLANTS   2:25 SUNDAY, MARCH 5, 1978   7

PLANTING DATE =249

PLOT OF CULM_DEN*DAY   SYMBOL USED IS *
PLOT OF FLOWER_C*DAY   SYMBOL USED IS 0

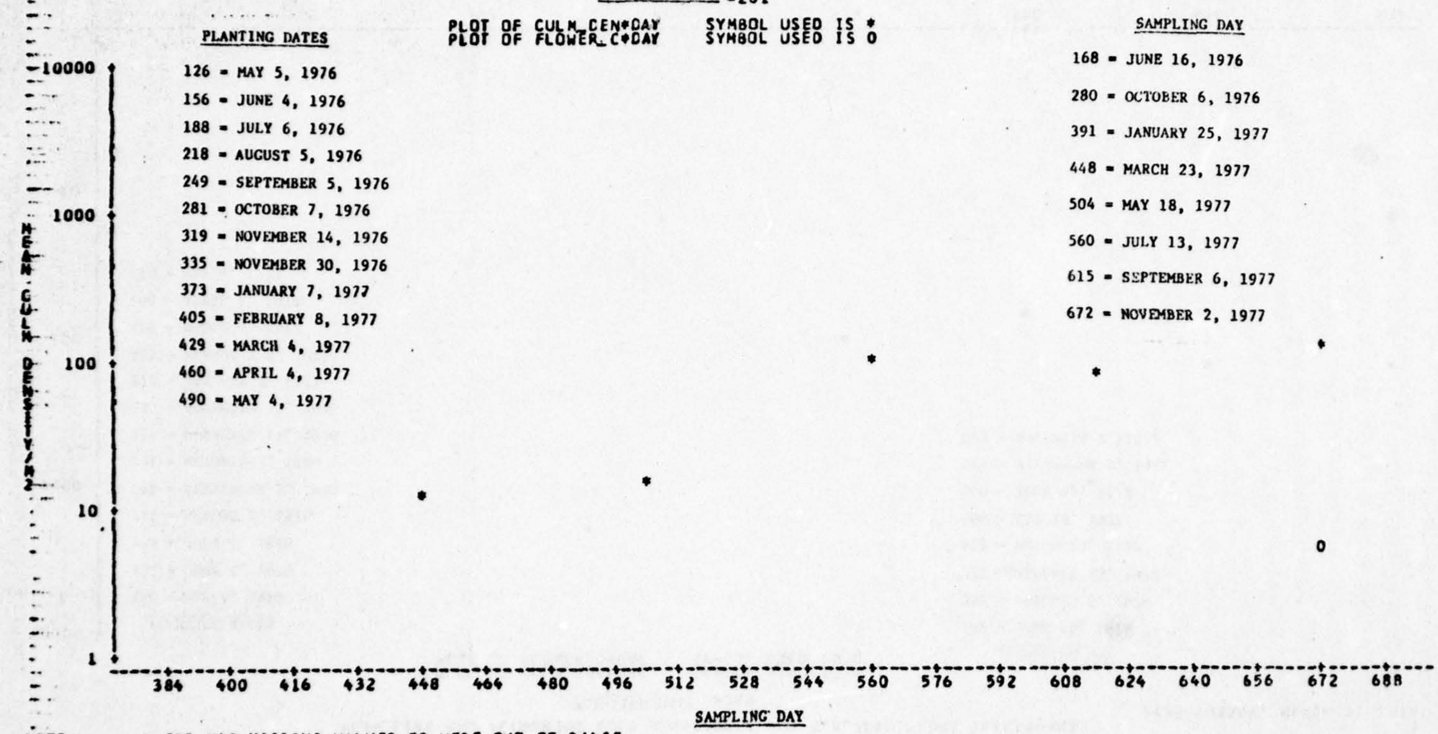


NOTE: 7 OBS HAD MISSING VALUES OR WERE OUT OF RANGE

MEAN LIVE AND FLOWERING CULM DENSITY/M2 FOR S.ALTERNIFLORA TRANSPLANTS   2:25 SUNDAY, MARCH 5, 1978   8

PLANTING DATE =281

PLOT OF CULM_CEN*DAY   SYMBOL USED IS *
PLOT OF FLOWER_C*DAY   SYMBOL USED IS 0



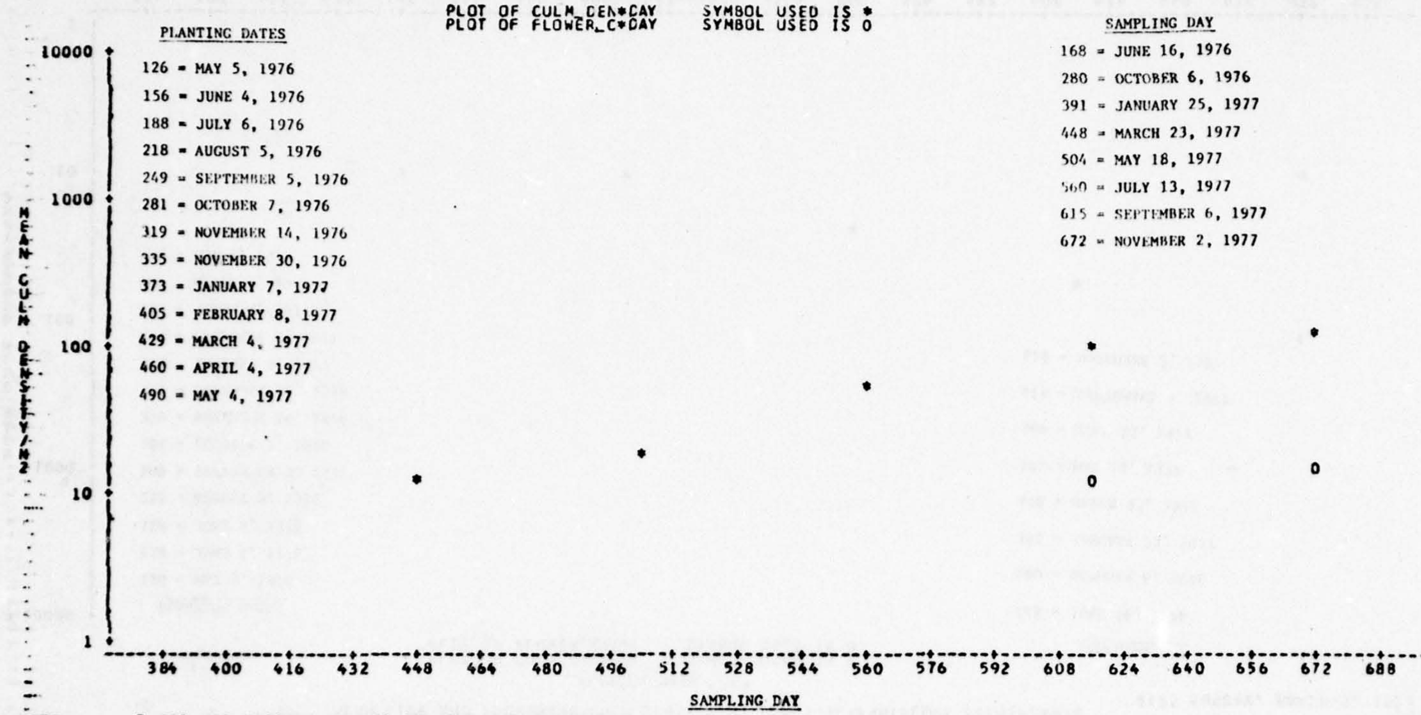
NOTE: 6 OBS HAD MISSING VALUES OR WERE OUT OF RANGE

9

MEAN LIVE AND FLOWERING CULM DENSITY/M2 FOR S.ALTERNIFLORA TRANSPLANTS 2:25 SUNDAY, MARCH 5, 1978

PLANTING DATE =319

PLOT OF CULM_DEN*DAY SYMBOL USED IS *
PLOT OF FLOWER_C*DAY SYMBOL USED IS 0

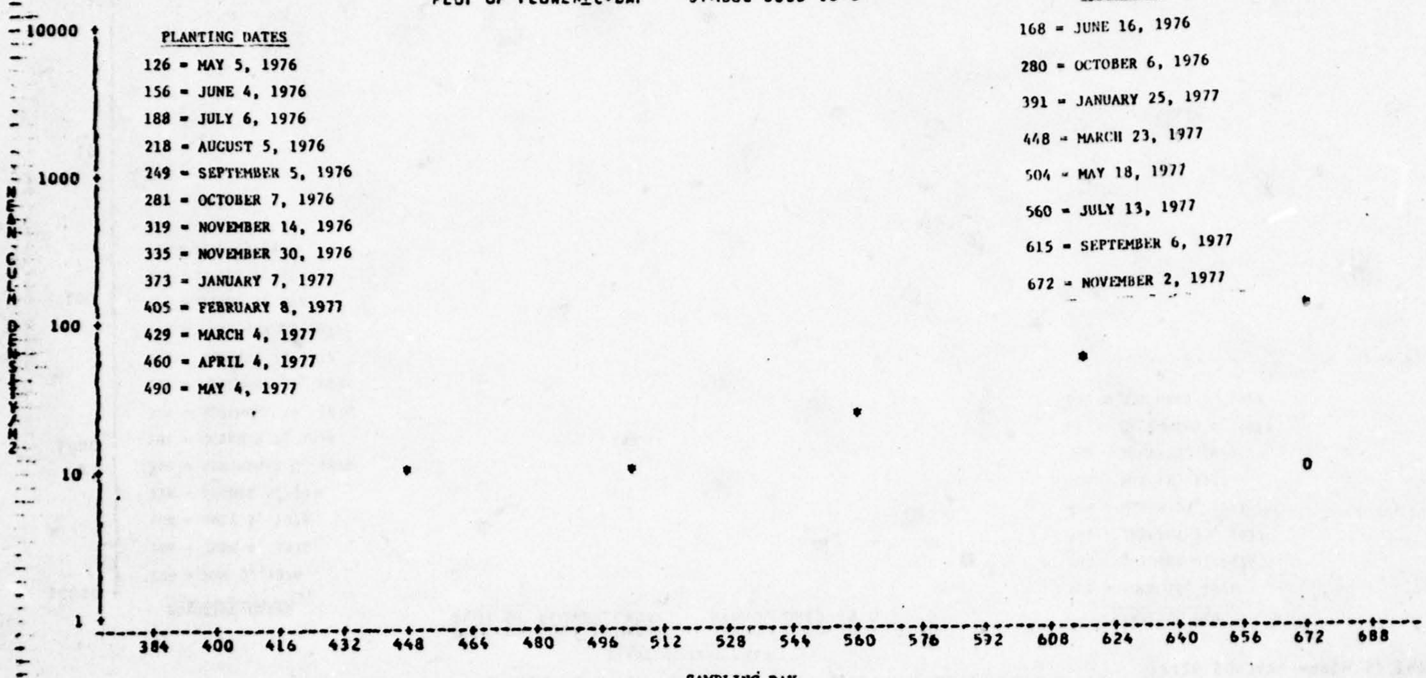


NOTE: 5 OBS HAD MISSING VALUES OR WERE OUT OF RANGE

MEAN LIVE AND FLOWERING CULM DENSITY/M2 FOR S.ALTERNIFLORA TRANSPLANTS 2:25 SUNDAY, MARCH 5, 1978 10

PLANTING DATE =335

PLOT OF CULM_DEN*DAY SYMBOL USED IS *
PLOT OF FLOWER_C*DAY SYMBOL USED IS O

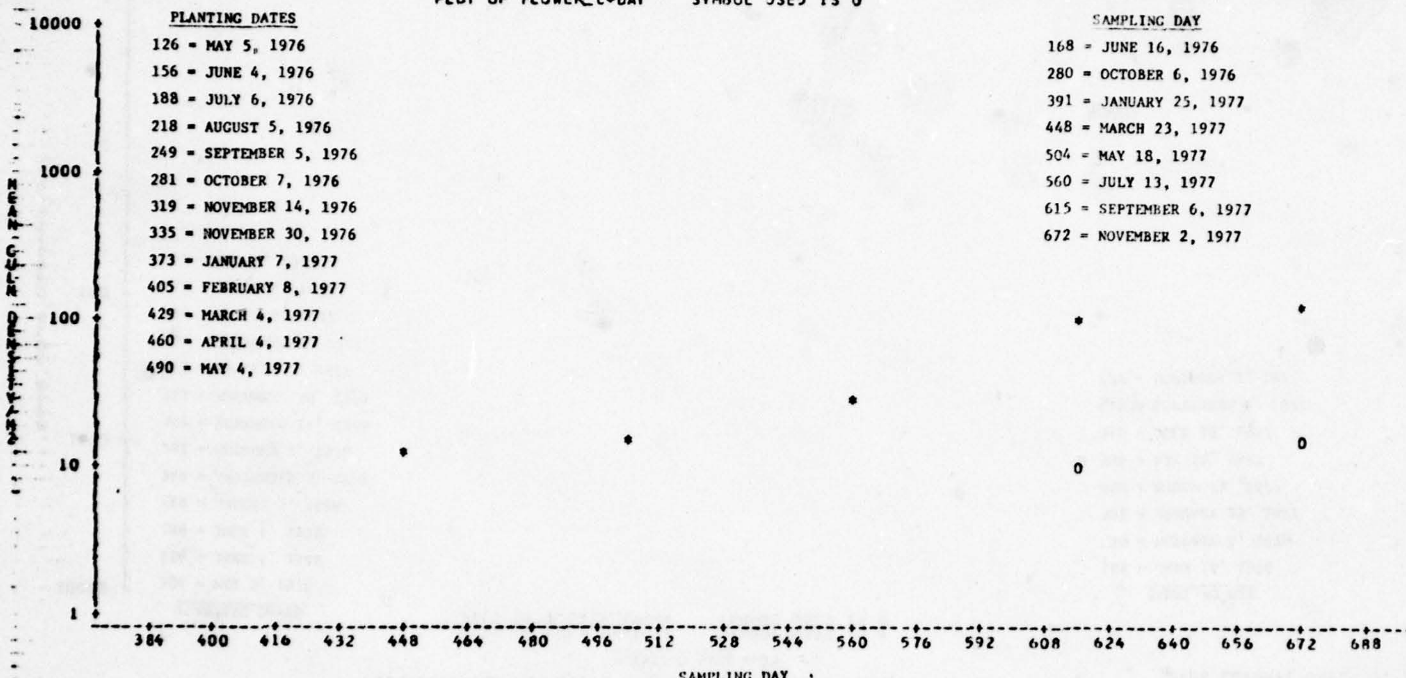


NOTE: 6 OBS HAD MISSING VALUES OR WERE OUT OF RANGE

MEAN LIVE AND FLOWERING CULM DENSITY/M2 FOR S.ALTERNIFLORA TRANSPLANTS 2:25 SUNDAY, MARCH 5, 1978

PLANTING DATE =373

PLOT OF CULM_DEN*DAY SYMBOL USED IS *
PLOT OF FLOWER_C*DAY SYMBOL USED IS 0

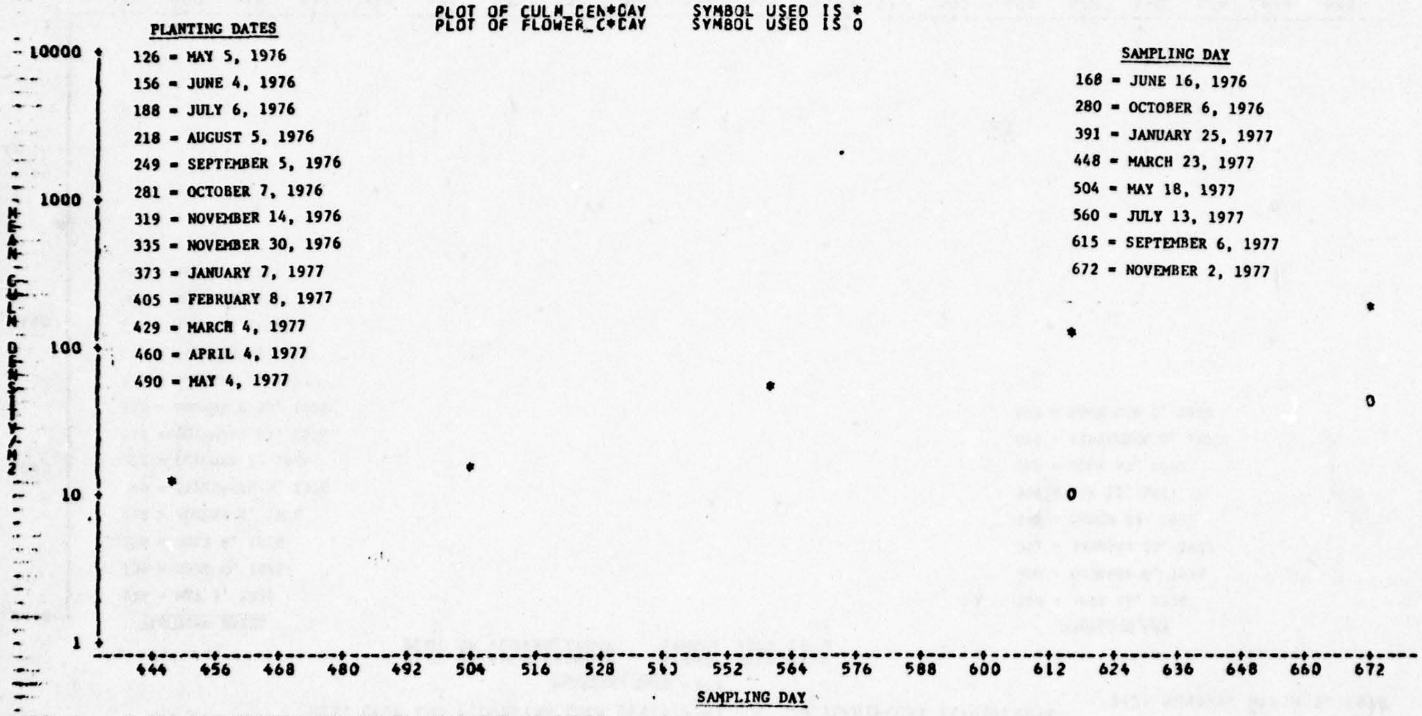


NOTE: 5 OBS HAD MISSING VALUES OR WERE OUT OF RANGE

MEAN LIVE AND FLOWERING CULM DENSITY/M2 FOR S.ALTERNIFLORA TRANSPLANTS

PLANTING DATE =405

PLOT OF CULM_DEN*DAY SYMBOL USED IS *
PLOT OF FLOWER_C*DAY SYMBOL USED IS 0



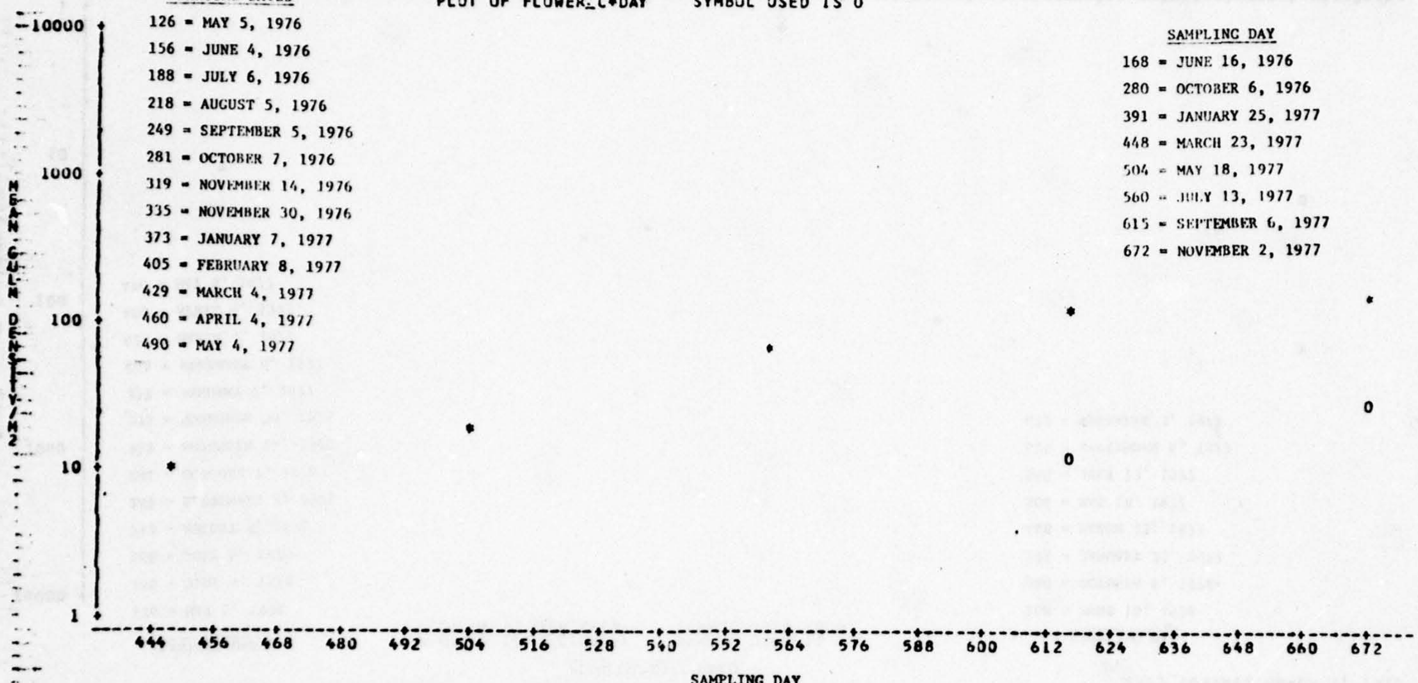
NOTE: 3 OBS HAD MISSING VALUES OR WERE OUT OF RANGE

MEAN LIVE AND FLOWERING CULM DENSITY/M2 FOR S.ALTERNIFLORA TRANSPLANTS

2:25 SUNDAY, MARCH 5, 1978 13

PLANTING DATE =429

PLOT OF CULM_DEN*DAY SYMBOL USED IS *
PLOT OF FLOWER_C*DAY SYMBOL USED IS 0



PLANTING DATES

126 = MAY 5, 1976
156 = JUNE 4, 1976
188 = JULY 6, 1976
218 = AUGUST 5, 1976
249 = SEPTEMBER 5, 1976
281 = OCTOBER 7, 1976
319 = NOVEMBER 14, 1976
335 = NOVEMBER 30, 1976
373 = JANUARY 7, 1977
405 = FEBRUARY 8, 1977
429 = MARCH 4, 1977
460 = APRIL 4, 1977
490 = MAY 4, 1977

SAMPLING DAY

168 = JUNE 16, 1976
280 = OCTOBER 6, 1976
391 = JANUARY 25, 1977
448 = MARCH 23, 1977
504 = MAY 18, 1977
560 = JULY 13, 1977
615 = SEPTEMBER 6, 1977
672 = NOVEMBER 2, 1977

NOTE: 3 OBS HAD MISSING VALUES OR WERE OUT OF RANGE

MEAN LIVE AND FLOWERING CULM DENSITY/M2 FOR S.ALTERNIFLORA TRANSPLANTS 2:25 SUNDAY, MARCH 5, 1978 14

PLANTING DATE =460

PLOT OF CUL¶_CEN*DAY SYMBOL USED IS *
PLOT OF FLOWER_C*DAY SYMBOL USED IS 0

PLANTING DATES

126 = MAY 5, 1976
156 = JUNE 4, 1976
188 = JULY 6, 1976
218 = AUGUST 5, 1976
249 = SEPTEMBER 5, 1976
281 = OCTOBER 7, 1976
319 = NOVEMBER 14, 1976
335 = NOVEMBER 30, 1976
373 = JANUARY 7, 1977
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SAMPLING DAY

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560 = JULY 13, 1977
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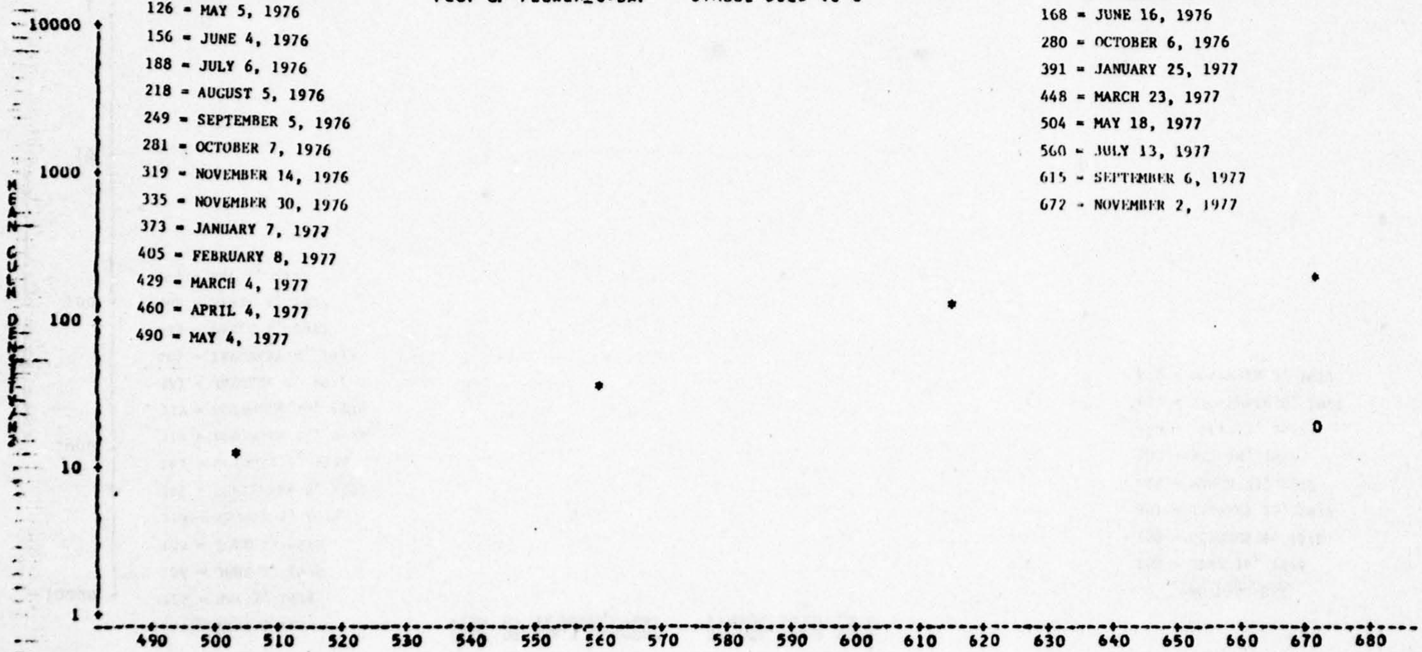
672 = NOVEMBER 2, 1977

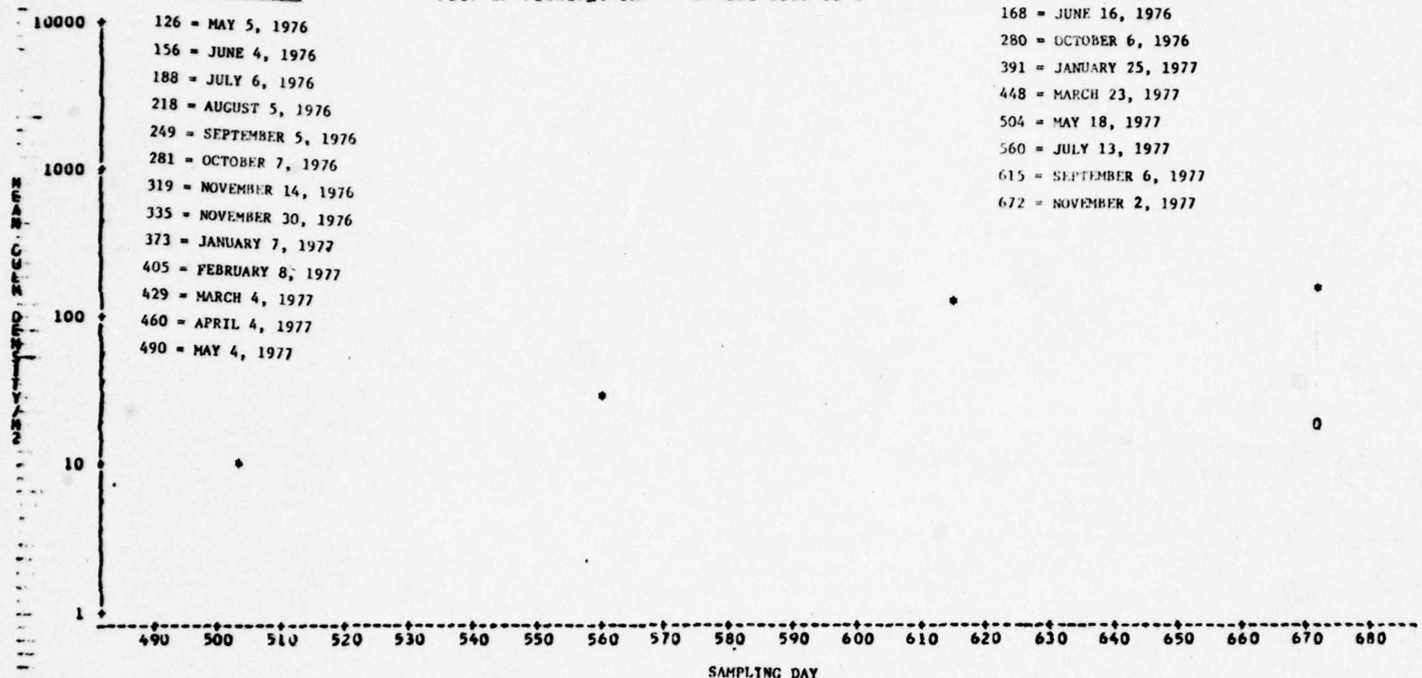


NOTE: 3 OBS HAD MISSING VALUES OR WERE OUT OF RANGE

MEAN LIVE AND FLOWERING CULM DENSITY/M2 FOR S.ALTERNIFLORA TRANSPLANTS 2:25 SUNDAY, MARCH 5, 1978 15

PLANTING DATE =490

PLOT OF CULM_DEN*DAY SYMBOL USED IS *
PLOT OF FLOWER_C*DAY SYMBOL USED IS 0



NOTE: 3 OBS HAD MISSING VALUES OR WERE OUT OF RANGE

APPENDIX H

BUTTERMILK SOUND PLANT INVASION

Legend for Variable Codes

inv = Invading plant species (See Table 51 for species codes)

Zone

1 = Lower third of intertidal zone

2 = Middle third of intertidal zone

3 = Upper third of intertidale zone

Species

1 = *Borrichia frutescens*

2 = *Distichlis spicata*

3 = *Iva frutescens*

4 = *Juncus roemerianus*

5 = *Spartina alterniflora*

6 = *Spartina cynosuroides*

7 = *Spartina patens*

8 = No plant (control)

Fert

1 = No fertilizer

2 = Inorganic 122g $/m^2$

3 = Inorganic 244g $/m^2$

4 = Organic 34g $/m^2$

5 = Organic 67g $/m^2$

Prop

1 = Sprigs

2 = Seeds

Season

Spring = January through June

Fall = July through December

Yr

75 = 1975

76 = 1976

77 = 1977

PART 1

Invading plant species by year, season and zone for each treatment.

PART 2

Invading plant species by zone for each treatement.

PART 1

YR=75   SEASON=FALL

TABLE OF ZONE BY INV

ZONE / INV (FREQUENCY, CELL CHI2, PERCENT, ROW PCT, COL PCT)	0	1	16	24	TOTAL
1	75 0.0 13.42 100.00 13.64	0 0.4 0.00 0.00 0.00	0 0.4 0.00 0.00 0.00	0 0.4 0.00 0.00 0.00	75 13.42
2	184 0.0 32.92 100.00 33.45	0 1.0 0.00 0.00 0.00	0 1.0 0.00 0.00 0.00	0 1.0 0.00 0.00 0.00	184 32.92
3	291 0.1 52.06 97.00 52.91	3 1.2 0.54 1.00 100.00	3 1.2 0.54 1.00 100.00	3 1.2 0.54 1.00 100.00	300 53.67
TOTAL	550 98.39	3 0.54	3 0.54	3 0.54	559 100.00

STATISTICAL ANALYSIS SYSTEM 22:28 WEDNESDAY, DECEMBER 21, 1977 57

YR=75 SEASON=FALL ZONE=1

TABLE OF SPECIES BY INV

SPECIES / INV — FREQUENCY, CELL CHI2, PERCENT, ROW PCT, COL PCT	0	TOTAL
1	2 0.0 2.67 100.00 2.67	2 2.67
2	5 0.0 6.67 100.00 6.67	5 6.67
4	21 0.0 28.00 100.00 28.00	21 28.00
5	29 0.0 38.67 100.00 38.67	29 38.67
6	8 0.0 10.67 100.00 10.67	8 10.67
7	10 0.0 13.33 100.00 13.33	10 13.33
TOTAL	75 100.00	75 100.00

YR=75 SEASON=FALL ZONE=1

TABLE OF FERT BY INV

FERT / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	TOTAL
1	15 0.0 20.00 100.00 20.00	15 20.00
2	15 0.0 20.00 100.00 20.00	15 20.00
3	16 0.0 21.33 100.00 21.33	16 21.33
4	11 0.0 14.67 100.00 14.67	11 14.67
5	18 0.0 24.00 100.00 24.00	18 24.00
TOTAL	75 100.00	75 100.00

STATISTICAL ANALYSIS SYSTEM 61

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YR=75 SEASON=FALL ZONE=2

TABLE OF SPECIES BY INV

SPECIES / INV — FREQUENCY, CELL CHI2, PERCENT, ROW PCT, COL PCT	0	TOTAL
1	22 0.0 11.96 100.00 11.96	22 11.96
2	27 0.0 14.67 100.00 14.67	27 14.67
3	10 0.0 5.43 100.00 5.43	10 5.43
4	26 0.0 14.13 100.00 14.13	26 14.13
TOTAL	184 100.00	184 100.00

(CONTINUED)

YR=75 SEASON=FALL ZONE=2

TABLE OF SPECIES BY INV

SPECIES / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	TOTAL
5	42 0.0 22.83 100.00 22.83	42 22.83
6	28 0.0 15.22 100.00 15.22	28 15.22
7	27 0.0 14.67 100.00 14.67	27 14.67
8	2 0.0 1.09 100.00 1.09	2 1.09
TOTAL	184 100.00	184 100.00

YR=75 SEASON=FALL ZONE=2

TABLE OF FERT BY INV

FERT / INV (FREQUENCY, CELL CHI2, PERCENT, ROW PCT, COL PCT)	0	TOTAL
1	40 0.0 21.74 100.00 21.74	40 21.74
2	38 0.0 20.65 100.00 20.65	38 20.65
3	36 0.0 19.57 100.00 19.57	36 19.57
4	40 0.0 21.74 100.00 21.74	40 21.74
5	30 0.0 16.30 100.00 16.30	30 16.30
TOTAL	184 100.00	184 100.00

STATISTICAL ANALYSIS SYSTEM   22:28 WEDNESDAY, DECEMBER 21, 1977   66

YR=75 SEASON=FALL ZONE=3

TABLE OF SPECIES BY INV

SPECIES INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	1	16	24	TOTAL
1	43 0.0 14.33 95.56 14.78	0 0.4 0.00 0.00 0.00	1 0.7 0.33 2.22 33.33	1 0.7 0.33 2.22 33.33	45 15.00
2	44 0.0 14.67 100.00 15.12	0 0.4 0.00 0.00 0.00	0 0.4 0.00 0.00 0.00	0 0.4 0.00 0.00 0.00	44 14.67
3	33 0.0 11.00 97.06 11.34	0 0.3 0.00 0.00 0.00	1 1.3 0.33 2.94 33.33	0 0.3 0.00 0.00 0.00	34 11.33
4	42 0.0 14.00 97.67 14.43	0 0.4 0.00 0.00 0.00	1 0.8 0.33 2.33 33.33	0 0.4 0.00 0.00 0.00	43 14.33
5	43 0.0 14.33 97.73 14.78	1 0.7 0.33 2.27 33.33	0 0.4 0.00 0.00 0.00	0 0.4 0.00 0.00 0.00	44 14.67
6	42 0.0 14.00 97.67 14.43	1 0.8 0.33 2.33 33.33	0 0.4 0.00 0.00 0.00	0 0.4 0.00 0.00 0.00	43 14.33
7	44 0.0 14.67 97.78 15.12	0 0.4 0.00 0.00 0.00	0 0.4 0.00 0.00 0.00	1 0.7 0.33 2.22 33.33	45 15.00
8	0 1.9 0.00 0.00 0.00	1 48.0 0.33 50.00 33.33	0 0.3 0.00 0.00 0.00	1 48.0 0.33 50.00 33.33	2 0.67
TOTAL	291 97.00	3 1.00	3 1.00	3 1.00	300 100.00

H10

YR=75 SEASON=FALL ZONE=3

TABLE OF FERT BY INV

FERT / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	1	16	24	TOTAL
1	60 0.0 20.00 95.24 20.62	2 3.0 0.67 3.17 66.67	0 0.6 0.00 0.00 0.00	1 0.2 0.33 1.59 33.33	63 21.00
2	56 0.0 18.67 96.55 19.24	1 0.3 0.33 1.72 33.33	1 0.3 0.33 1.72 33.33	0 0.6 0.00 0.00 0.00	58 19.33
3	56 0.1 18.67 100.00 19.24	0 0.6 0.00 0.00 0.00	0 0.6 0.00 0.00 0.00	0 0.6 0.00 0.00 0.00	56 18.67
4	59 0.0 19.67 98.33 20.27	0 0.6 0.00 0.00 0.00	0 0.6 0.00 0.00 0.00	1 0.3 0.33 1.67 33.33	60 20.00
5	60 0.0 20.00 95.24 20.62	0 0.6 0.00 0.00 0.00	2 3.0 0.67 3.17 66.67	1 0.2 0.33 1.59 33.33	63 21.00
TOTAL	291 97.00	3 1.00	3 1.00	3 1.00	300 100.00

YR=75 SEASON=FALL ZONE=3

TABLE OF PROP BY INV

PROP / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	1	16	24	TOTAL
1	291 0.0 97.00 97.00 100.00	3 0.0 1.00 1.00 100.00	3 0.0 1.00 1.00 100.00	3 0.0 1.00 1.00 100.00	300 100.00
TOTAL	291 97.00	3 1.00	3 1.00	3 1.00	300 100.00

STATISTICAL ANALYSIS SYSTEM

STATISTICAL ANALYSIS SYSTEM 22:28 WED

YR=76 SEASON=SPRING

TABLE OF ZONE BY INV

ZONE / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	1	2	3	6	7	8	9	10	13	16	18	19	24	TOTAL
1	17 0.6 3.05 100.00 3.69	0 0.9 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 1.2 0.00 0.00 0.00	0 0.0 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 0.0 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	17 3.05
2	88 4.7 15.77 65.67 19.09	6 0.1 1.08 4.48 21.43	1 0.6 0.18 0.75 50.00	0 0.7 0.00 0.00 0.00	33 54.5 5.91 24.63 80.49	1 2.4 0.18 0.75 100.00	0 0.5 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	0 0.7 0.00 0.00 0.00	0 1.0 0.00 0.00 0.00	2 4.8 0.36 1.49 100.00	1 0.6 0.18 0.75 50.00	2 4.8 0.36 1.49 100.00	0 1.4 0.00 0.00 0.00	134 24.01
3	356 1.2 63.80 87.47 77.22	22 0.1 3.94 5.41 78.57	1 0.1 0.18 0.25 50.00	3 0.3 0.54 0.74 100.00	8 16.0 1.43 1.97 19.51	0 0.7 0.00 0.00 0.00	2 0.2 0.36 0.49 100.00	1 0.1 0.18 0.25 100.00	3 0.3 0.54 0.74 100.00	4 0.4 0.72 0.98 100.00	0 1.5 0.00 0.00 0.00	1 0.1 0.18 0.25 50.00	0 1.5 0.00 0.00 0.00	6 0.6 1.08 1.47 100.00	407 72.94
TOTAL	461 82.62	28 5.02	2 0.36	3 0.54	41 7.35	1 0.18	2 0.36	1 0.18	3 0.54	4 0.72	2 0.36	2 0.36	2 0.36	6 1.08	558 100.00

(CONTINUED)

YR=76 SEASON=SPRING ZONE=1

TABLE OF SPECIES BY INV

SPECIES / INV (FREQUENCY, CELL CHI2, PERCENT, ROW PCT, COL PCT)	0	TOTAL
4	1 0.0 5.88 100.00 5.88	1 5.88
5	15 0.0 88.24 100.00 88.24	15 88.24
8	1 0.0 5.88 100.00 5.88	1 5.88
TOTAL	17 100.00	17 100.00

YR=76 SEASON=SPRING ZONE=1

TABLE OF FERT BY INV

FERT / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	TOTAL
1	4 0.0 23.53 100.00 23.53	4 23.53
2	3 0.0 17.65 100.00 17.65	3 17.65
3	1 0.0 5.88 100.00 5.88	1 5.88
5	9 0.0 52.94 100.00 52.94	9 52.94
TOTAL	17 100.00	17 100.00

YR=76   SEASON=SPRING   ZONE=2

TABLE OF SPECIES BY INV

SPECIES / INV (FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT)	0	1	2	6	7	16	18	19	TOTAL
1	12 0.1 8.96 70.59 13.64	0 0.8 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	5 0.2 3.73 29.41 15.15	0 0.1 0.00 0.00 0.00	0 0.3 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 0.3 0.00 0.00 0.00	17 12.69
2	8 0.9 5.97 47.06 9.09	2 2.0 1.49 11.76 33.33	0 0.1 0.00 0.00 0.00	5 0.2 3.73 29.41 15.15	0 0.1 0.00 0.00 0.00	1 2.2 0.75 5.88 50.00	0 0.1 0.00 0.00 0.00	1 2.2 0.75 5.88 50.00	17 12.69
3	2 1.0 1.49 33.33 2.27	1 2.0 0.75 16.67 16.67	0 0.0 0.00 0.00 0.00	3 1.6 2.24 50.00 9.09	0 0.0 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 0.0 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	6 4.48
4	1 2.2 0.75 16.67 1.14	0 0.3 0.00 0.00 0.00	0 0.0 0.00 0.00 0.00	4 4.3 2.99 66.67 12.12	0 0.0 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 0.0 0.00 0.00 0.00	1 9.3 0.75 16.67 50.00	6 4.48
5	52 8.5 38.81 98.11 59.09	0 2.4 0.00 0.00 0.00	0 0.4 0.00 0.00 0.00	1 11.1 0.75 1.89 3.03	0 0.4 0.00 0.00 0.00	0 0.8 0.00 0.00 0.00	0 0.4 0.00 0.00 0.00	0 0.8 0.00 0.00 0.00	53 39.55
6	10 0.0 7.46 62.50 11.36	1 0.1 0.75 6.25 16.67	0 0.1 0.00 0.00 0.00	4 0.0 2.99 25.00 12.12	1 6.5 0.75 6.25 100.00	0 0.2 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	16 11.94
7	3 0.2 2.24 50.00 3.41	0 0.3 0.00 0.00 0.00	1 20.4 0.75 16.67 100.00	2 0.2 1.49 33.33 6.06	0 0.0 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 0.0 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	6 4.48
8	0 8.5 0.00 0.00 0.00	2 3.5 1.49 15.38 33.33	0 0.1 0.00 0.00 0.00	9 10.5 6.72 69.23 27.27	0 0.1 0.00 0.00 0.00	1 3.3 0.75 7.69 50.00	1 8.4 0.75 7.69 100.00	0 0.2 0.00 0.00 0.00	13 9.70
TOTAL	88 65.67	6 4.48	1 0.75	33 24.63	1 0.75	2 1.49	1 0.75	2 1.49	134 100.00

YR=76 SEASON=SPRING ZONE=2

TABLE OF FERT BY INV

FERT / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	1	2	6	7	16	18	19	TOTAL
1	18 0.0 13.43 66.67 20.45	0 1.2 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	9 0.8 6.72 33.33 27.27	0 0.2 0.00 0.00 0.00	0 0.4 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	0 0.4 0.00 0.00 0.00	27 20.15
2	18 0.0 13.43 64.29 20.45	1 0.1 0.75 3.57 16.67	1 3.0 0.75 3.57 100.00	5 0.5 3.73 17.86 15.15	1 3.0 0.75 3.57 100.00	1 0.8 0.75 3.57 50.00	0 0.2 0.00 0.00 0.00	1 0.8 0.75 3.57 50.00	28 20.90
3	18 0.3 13.43 75.00 20.45	2 0.8 1.49 8.33 33.33	0 0.2 0.00 0.00 0.00	4 0.6 2.99 16.67 12.12	0 0.2 0.00 0.00 0.00	0 0.4 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	0 0.4 0.00 0.00 0.00	24 17.91
4	18 0.3 13.43 58.06 20.45	1 0.1 0.75 3.23 16.67	0 0.2 0.00 0.00 0.00	9 0.2 6.72 29.03 27.27	0 0.2 0.00 0.00 0.00	1 0.6 0.75 3.23 50.00	1 2.6 0.75 3.23 100.00	1 0.6 0.75 3.23 50.00	31 23.13
5	16 0.0 11.94 66.67 18.18	2 0.8 1.49 8.33 33.33	0 0.2 0.00 0.00 0.00	6 0.0 4.48 25.00 18.18	0 0.2 0.00 0.00 0.00	0 0.4 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	0 0.4 0.00 0.00 0.00	24 17.91
TOTAL	88 65.67	6 4.48	1 0.75	33 24.63	1 0.75	2 1.49	1 0.75	2 1.49	134 100.00

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

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YR=76 SEASON=SPRING ZONE=2

TABLE OF PROP BY INV

PROP / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	1	2	6	7	16	18	19	TOTAL
1	73 1.4 54.48 75.26 82.95	3 0.4 2.24 3.09 50.00	0 0.7 0.00 0.00 0.00	20 0.6 14.93 20.62 60.61	1 0.1 0.75 1.03 100.00	0 1.4 0.00 0.00 0.00	0 0.7 0.00 0.00 0.00	0 1.4 0.00 0.00 0.00	97 72.39
2	15 3.6 11.19 40.54 17.05	3 1.1 2.24 8.11 50.00	1 1.9 0.75 2.70 100.00	13 1.7 9.70 35.14 39.39	0 0.3 0.00 0.00 0.00	2 3.8 1.49 5.41 100.00	1 1.9 0.75 2.70 100.00	2 3.8 1.49 5.41 100.00	37 27.61
TOTAL	88 65.67	6 4.48	1 0.75	33 24.63	1 0.75	2 1.49	1 0.75	2 1.49	134 100.00

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YR=76 SEASON=SPRING ZONE=3

TABLE OF SPECIES BY INV

SPECIES INV

FREQUENCY / CELL CHI2 / PERCENT / ROW PCT / COL PCT

SPECIES	0	1	2	3	6	8	9	10	13	18	24	TOTAL
1	60	1	1	0	1	1	0	0	0	0	0	64
	0.3	1.7	4.5	0.5	0.1	1.5	0.2	0.5	0.6	0.2	0.9	
	14.74	0.25	0.25	0.00	0.25	0.25	0.00	0.00	0.00	0.00	0.00	15.72
	93.75	1.56	1.56	0.00	1.56	1.56	0.00	0.00	0.00	0.00	0.00	
	16.85	4.55	100.00	0.00	12.50	50.00	0.00	0.00	0.00	0.00	0.00	
2	60	5	0	0	1	0	0	3	0	0	3	72
	0.1	0.3	0.2	0.5	0.1	0.4	0.2	11.5	0.7	0.2	3.5	
	14.74	1.23	0.00	0.00	0.25	0.00	0.00	0.74	0.00	0.00	0.74	17.69
	83.33	6.94	0.00	0.00	1.39	0.00	0.00	4.17	0.00	0.00	4.17	
	16.85	22.73	0.00	0.00	12.50	0.00	0.00	100.00	0.00	0.00	50.00	
3	26	5	0	1	2	0	0	0	1	0	1	36
	1.0	4.8	0.1	2.0	2.4	0.2	0.1	0.3	1.2	0.1	0.4	
	6.39	1.23	0.00	0.25	0.49	0.00	0.00	0.00	0.25	0.00	0.25	8.85
	72.22	13.89	0.00	2.78	5.56	0.00	0.00	0.00	2.78	0.00	2.78	
	7.30	22.73	0.00	33.33	25.00	0.00	0.00	0.00	25.00	0.00	16.67	
4	44	1	0	0	1	0	0	0	0	0	0	46
	0.4	0.9	0.1	0.3	0.0	0.2	0.1	0.3	0.5	0.1	0.7	
	10.81	0.25	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00	11.30
	95.65	2.17	0.00	0.00	2.17	0.00	0.00	0.00	0.00	0.00	0.00	
	12.36	4.55	0.00	0.00	12.50	0.00	0.00	0.00	0.00	0.00	0.00	
5	60	2	0	2	2	1	0	0	0	0	0	67
	0.0	0.7	0.2	4.6	0.4	1.4	0.2	0.5	0.7	0.2	1.0	
	14.74	0.49	0.00	0.49	0.49	0.25	0.00	0.00	0.00	0.00	0.00	16.46
	89.55	2.99	0.00	2.99	2.99	1.49	0.00	0.00	0.00	0.00	0.00	
	16.85	9.09	0.00	66.67	25.00	50.00	0.00	0.00	0.00	0.00	0.00	
6	50	0	0	0	0	0	1	0	2	1	1	55
	0.1	3.0	0.1	0.4	1.1	0.3	5.5	0.4	3.9	5.5	0.0	
	12.29	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.49	0.25	0.25	13.51
	90.91	0.00	0.00	0.00	0.00	0.00	1.82	0.00	3.64	1.82	1.82	
	14.04	0.00	0.00	0.00	0.00	0.00	100.00	0.00	50.00	100.00	16.67	
7	55	3	0	0	1	0	0	0	0	0	0	59
	0.2	0.0	0.1	0.4	0.0	0.3	0.1	0.4	0.6	0.1	0.9	
	13.51	0.74	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00	14.50
	93.22	5.08	0.00	0.00	1.69	0.00	0.00	0.00	0.00	0.00	0.00	
	15.45	13.64	0.00	0.00	12.50	0.00	0.00	0.00	0.00	0.00	0.00	
8	1	5	0	0	0	0	0	0	1	0	1	8
	5.1	48.2	0.0	0.1	0.2	0.0	0.0	0.1	10.8	0.0	6.6	
	0.25	1.23	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.25	1.97
	12.50	62.50	0.00	0.00	0.00	0.00	0.00	0.00	12.50	0.00	12.50	
	0.28	22.73	0.00	0.00	0.00	0.00	0.00	0.00	25.00	0.00	16.67	
TOTAL	356	22	1	3	8	2	1	3	4	1	6	407
	87.47	5.41	0.25	0.74	1.97	0.49	0.25	0.74	0.98	0.25	1.47	100.00

STATISTICAL ANALYSIS SYSTEM 22:28 WEDNESDAY, DECEMBER 21, 1977 110

YR=76 SEASON=SPRING ZONE=3

TABLE OF FERT BY INV

FERT / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	1	2	3	6	8	9	10	13	18	24	TOTAL
1	72 0.0 17.69 86.75 20.22	6 0.5 1.47 7.23 27.27	0 0.2 0.00 0.00 0.00	2 3.1 0.49 2.41 66.67	2 0.1 0.49 2.41 25.00	0 0.4 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	0 0.6 0.00 0.00 0.00	1 0.0 0.25 1.20 25.00	0 0.2 0.00 0.00 0.00	0 1.2 0.00 0.00 0.00	83 20.39
2	73 0.0 17.94 86.90 20.51	5 0.0 1.23 5.95 22.73	0 0.2 0.00 0.00 0.00	1 0.2 0.25 1.19 33.33	4 3.3 0.98 4.76 50.00	1 0.8 0.25 1.19 50.00	0 0.2 0.00 0.00 0.00	0 0.6 0.00 0.00 0.00	0 0.8 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	0 1.2 0.00 0.00 0.00	84 20.64
3	57 0.4 14.00 80.28 16.01	5 0.4 1.23 7.04 22.73	1 3.9 0.25 1.41 100.00	0 0.5 0.00 0.00 0.00	2 0.3 0.49 2.82 25.00	0 0.3 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	1 0.4 0.25 1.41 33.33	2 2.4 0.49 2.82 50.00	1 3.9 0.25 1.41 100.00	2 0.9 0.49 2.82 33.33	71 17.44
4	75 0.1 18.43 91.46 21.07	3 0.5 0.74 3.66 13.64	0 0.2 0.00 0.00 0.00	0 0.6 0.00 0.00 0.00	0 1.6 0.00 0.00 0.00	0 0.4 0.00 0.00 0.00	1 3.2 0.25 1.22 100.00	0 0.6 0.00 0.00 0.00	1 0.0 0.25 1.22 25.00	0 0.2 0.00 0.00 0.00	2 0.5 0.49 2.44 33.33	82 20.15
5	79 0.1 19.41 90.80 22.19	3 0.6 0.74 3.45 13.64	0 0.2 0.00 0.00 0.00	0 0.6 0.00 0.00 0.00	0 1.7 0.00 0.00 0.00	1 0.8 0.25 1.15 50.00	0 0.2 0.00 0.00 0.00	2 2.9 0.49 2.30 66.67	0 0.9 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	2 0.4 0.49 2.30 33.33	87 21.38
TOTAL	356 87.47	22 5.41	1 0.25	3 0.74	8 1.97	2 0.49	1 0.25	3 0.74	4 0.98	1 0.25	6 1.47	407 100.00

STATISTICAL ANALYSIS SYSTEM

22:28 WEDNESDAY, DECEMBER 21, 1977

YR=76 SEASON=SPRING ZONE=3

TABLE OF PROP BY INV

PROP	INV											
FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	1	2	3	6	8	9	10	13	18	24	TOTAL
1	297 0.2 72.97 89.73 83.43	15 0.5 3.69 4.53 68.18	0 0.8 0.00 0.00 0.00	3 0.1 0.74 0.91 100.00	2 3.1 0.49 0.60 25.00	1 0.2 0.25 0.30 50.00	0 0.8 0.00 0.00 0.00	3 0.1 0.74 0.91 100.00	4 0.2 0.98 1.21 100.00	1 0.0 0.25 0.30 100.00	5 0.0 1.23 1.51 83.33	331 81.33
2	59 0.8 14.50 77.63 16.57	7 2.0 1.72 9.21 31.82	1 3.5 0.25 1.32 100.00	0 0.6 0.00 0.00 0.00	6 13.6 1.47 7.89 75.00	1 1.1 0.25 1.32 50.00	1 3.5 0.25 1.32 100.00	0 0.6 0.00 0.00 0.00	0 0.7 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	1 0.0 0.25 1.32 16.67	76 18.67
TOTAL	356 87.47	22 5.41	1 0.25	3 0.74	8 1.97	2 0.49	1 0.25	3 0.74	4 0.98	1 0.25	6 1.47	407 100.00

STATISTICAL ANALYSIS SYSTEM 22:28 WEDNESDAY

YR=76 SEASON=FALL

TABLE OF ZONE BY INV

ZONE / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	1	2	3	4	5	6	7	8	9	10
1	9 12.7 1.08 81.82 4.09	1 0.2 0.12 9.09 0.85	0 0.3 0.00 0.00 0.00	0 1.2 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	1 1.3 0.12 9.09 0.44	0 0.1 0.00 0.00 0.00	0 0.5 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0. 0.0 0.0 0.0
2	61 1.5 7.34 22.59 27.73	12 18.1 1.44 4.44 10.17	3 3.5 0.36 1.11 11.54	0 28.3 0.00 0.00 0.00	0 2.3 0.00 0.00 0.00	2 0.0 0.24 0.74 28.57	175 137.5 21.06 64.81 76.75	1 1.0 0.12 0.37 12.50	0 13.0 0.00 0.00 0.00	7 3.3 0.84 2.59 63.64	1. 0.0 0.0 0.0
3	150 0.1 18.05 27.27 68.18	105 9.3 12.64 19.09 88.98	23 1.9 2.77 4.18 88.46	87 15.0 10.47 15.82 100.00	7 1.2 0.84 1.27 100.00	5 0.0 0.60 0.91 71.43	52 64.8 6.26 9.45 22.81	7 0.5 0.84 1.27 87.50	40 6.9 4.81 7.27 100.00	4 1.5 0.48 0.73 36.36	0. 0.3 0.5 100.0
TOTAL	220 26.47	118 14.20	26 3.13	87 10.47	7 0.84	7 0.84	228 27.44	8 0.96	40 4.81	11 1.32	0.3

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STATISTICAL ANALYSIS SYSTEM   22:28 WEDNESDAY, DECEMBER

YR=76 SEASON=FALL

TABLE OF ZONE BY INV

INV

12	13	14	15	16	18	19	20	21	23	24	TOTAL
0 0.0 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	0 0.0 0.00 0.00 0.00	0 0.0 0.00 0.00 0.00	0 0.0 0.00 0.00 0.00	0 0.3 0.00 0.00 0.00	0 0.0 0.00 0.00 0.00	0 0.0 0.00 0.00 0.00	0 0.0 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	11 1.32
0 1.0 0.00 0.00 0.00	0 5.5 0.00 0.00 0.00	1 2.2 0.12 0.37 8.33	0 0.6 0.00 0.00 0.00	2 1.1 0.24 0.74 66.67	0 0.3 0.00 0.00 0.00	6 0.7 0.72 2.22 23.08	0 1.0 0.00 0.00 0.00	0 0.3 0.00 0.00 0.00	0 0.3 0.00 0.00 0.00	0 2.3 0.00 0.00 0.00	270 32.49
3 0.5 0.36 0.55 100.00	17 2.9 2.05 3.09 100.00	11 1.2 1.32 2.00 91.67	2 0.3 0.24 0.36 100.00	1 0.5 0.12 0.18 33.33	1 0.2 0.12 0.18 100.00	20 0.5 2.41 3.64 76.92	3 0.5 0.36 0.55 100.00	1 0.2 0.12 0.18 100.00	1 0.1 0.12 0.18 100.00	7 1.2 0.84 1.27 100.00	550 66.19
3 0.36	17 2.05	12 1.44	2 0.24	3 0.36	1 0.12	26 3.13	3 0.36	1 0.12	1 0.12	7 0.84	831 100.00

YR=76 SEASON=FALL ZONE=1

TABLE OF SPECIES BY INV

SPECIES / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	1	6	TOTAL
2	1 0.0 9.09 100.00 11.11	0 0.1 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	1 9.09
5	8 0.3 72.73 100.00 88.89	0 0.7 0.00 0.00 0.00	0 0.7 0.00 0.00 0.00	8 72.73
7	0 1.6 0.00 0.00 0.00	1 3.7 9.09 50.00 100.00	1 3.7 9.09 50.00 100.00	2 18.18
TOTAL	9 81.82	1 9.09	1 9.09	11 100.00

YR=76 SEASON=FALL ZONE=1

TABLE OF FERT BY INV

FERT / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	1	6	TOTAL
1	2 0.1 18.18 100.00 22.22	0 0.2 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	2 18.18
2	2 0.1 18.18 100.00 22.22	0 0.2 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	2 18.18
3	0 1.6 0.00 0.00 0.00	1 3.7 9.09 50.00 100.00	1 3.7 9.09 50.00 100.00	2 18.18
5	5 0.2 45.45 100.00 55.56	0 0.5 0.00 0.00 0.00	0 0.5 0.00 0.00 0.00	5 45.45
TOTAL	9 81.82	1 9.09	1 9.09	11 100.00

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   22:28 WEDNESDAY, DECEMBER 21, 1977 77

YR=76 SEASON=FALL ZONE=1

TABLE OF PROP BY INV

PROP / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	1	6	TOTAL
1	8 0.0 72.73 80.00 88.89	1 0.0 9.09 10.00 100.00	1 0.0 9.09 10.00 100.00	10 90.91
2	1 0.0 9.09 100.00 11.11	0 0.1 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	1 9.09
TOTAL	9 81.82	1 9.09	1 9.09	11 100.00

STATISTICAL ANALYSIS SYSTEM 22:28 WEDNESDAY, DECEMBER 21, 1977 79

YR=76 SEASON=FALL ZONE=2

TABLE OF SPECIES BY INV

SPECIES	INV	0	1	2	5	6	7	9	14	16	19	TOTAL
1	FREQUENCY	1	0	1	0	32	0	2	0	0	1	37
	CELL CHI2	6.5	1.6	0.8	0.3	2.7	0.1	1.1	0.1	0.3	0.0	
	PERCENT	0.37	0.00	0.37	0.00	11.85	0.00	0.74	0.00	0.00	0.37	13.70
	ROW PCT	2.70	0.00	2.70	0.00	86.49	0.00	5.41	0.00	0.00	2.70	
	COL PCT	1.64	0.00	33.33	0.00	18.29	0.00	28.57	0.00	0.00	16.67	
2	FREQUENCY	4	2	0	0	20	0	0	0	1	1	28
	CELL CHI2	0.9	0.5	0.3	0.2	0.2	0.1	0.7	0.1	3.0	0.2	
	PERCENT	1.48	0.74	0.00	0.00	7.41	0.00	0.00	0.00	0.37	0.37	10.37
	ROW PCT	14.29	7.14	0.00	0.00	71.43	0.00	0.00	0.00	3.57	3.57	
	COL PCT	6.56	16.67	0.00	0.00	11.43	0.00	0.00	0.00	50.00	16.67	
3	FREQUENCY	2	3	0	0	25	0	0	1	0	0	31
	CELL CHI2	3.6	1.9	0.3	0.2	1.2	0.1	0.8	6.8	0.2	0.7	
	PERCENT	0.74	1.11	0.00	0.00	9.26	0.00	0.00	0.37	0.00	0.00	11.48
	ROW PCT	6.45	9.68	0.00	0.00	80.65	0.00	0.00	3.23	0.00	0.00	
	COL PCT	3.28	25.00	0.00	0.00	14.29	0.00	0.00	100.00	0.00	0.00	
4	FREQUENCY	1	2	0	1	18	0	0	0	0	1	23
	CELL CHI2	3.4	0.9	0.3	4.0	0.6	0.1	0.6	0.1	0.2	0.5	
	PERCENT	0.37	0.74	0.00	0.37	6.67	0.00	0.00	0.00	0.00	0.37	8.52
	ROW PCT	4.35	8.70	0.00	4.35	78.26	0.00	0.00	0.00	0.00	4.35	
	COL PCT	1.64	16.67	0.00	50.00	10.29	0.00	0.00	0.00	0.00	16.67	
5	FREQUENCY	43	0	0	0	7	0	1	0	0	0	51
	CELL CHI2	86.0	2.3	0.6	0.4	20.5	0.2	0.1	0.2	0.4	1.1	
	PERCENT	15.93	0.00	0.00	0.00	2.59	0.00	0.37	0.00	0.00	0.00	18.89
	ROW PCT	84.31	0.00	0.00	0.00	13.73	0.00	1.96	0.00	0.00	0.00	
	COL PCT	70.49	0.00	0.00	0.00	4.00	0.00	14.29	0.00	0.00	0.00	
6	FREQUENCY	7	0	1	1	22	0	1	0	0	1	33
	CELL CHI2	0.0	1.5	1.1	2.3	0.0	0.1	0.0	0.1	0.2	0.1	
	PERCENT	2.59	0.00	0.37	0.37	8.15	0.00	0.37	0.00	0.00	0.37	12.22
	ROW PCT	21.21	0.00	3.03	3.03	66.67	0.00	3.03	0.00	0.00	3.03	
	COL PCT	11.48	0.00	33.33	50.00	12.57	0.00	14.29	0.00	0.00	16.67	
7	FREQUENCY	1	0	1	0	20	0	2	0	0	0	24
	CELL CHI2	3.6	1.1	2.0	0.2	1.3	0.1	3.1	0.1	0.2	0.5	
	PERCENT	0.37	0.00	0.37	0.00	7.41	0.00	0.74	0.00	0.00	0.00	8.89
	ROW PCT	4.17	0.00	4.17	0.00	83.33	0.00	8.33	0.00	0.00	0.00	
	COL PCT	1.64	0.00	33.33	0.00	11.43	0.00	28.57	0.00	0.00	0.00	
8	FREQUENCY	2	5	0	0	31	1	1	0	1	2	43
	CELL CHI2	6.1	5.0	0.5	0.3	0.4	4.4	0.0	0.2	1.5	1.1	
	PERCENT	0.74	1.85	0.00	0.00	11.48	0.37	0.37	0.00	0.37	0.74	15.93
	ROW PCT	4.65	11.63	0.00	0.00	72.09	2.33	2.33	0.00	2.33	4.65	
	COL PCT	3.28	41.67	0.00	0.00	17.71	100.00	14.29	0.00	50.00	33.33	
TOTAL		61	12	3	2	175	1	7	1	2	6	270
		22.59	4.44	1.11	0.74	64.81	0.37	2.59	0.37	0.74	2.22	100.00

STATISTICAL ANALYSIS SYSTEM 84

22:28 WEDNESDAY, DECEMBER 21, 1977

YR=76 SEASON=FALL ZONE=2

TABLE OF PROP BY INV

PROP / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	1	2	5	6	7	9	14	16	19	TOTAL
1	36 2.4 13.33 29.27 59.02	4 0.4 1.48 3.25 33.33	0 1.4 0.00 0.00 0.00	1 0.0 0.37 0.81 50.00	77 0.1 28.52 62.60 44.00	1 0.7 0.37 0.81 100.00	2 0.4 0.74 1.63 28.57	0 0.5 0.00 0.00 0.00	0 0.9 0.00 0.00 0.00	2 0.2 0.74 1.63 33.33	123 45.56
2	25 2.0 9.26 17.01 40.98	8 0.3 2.96 5.44 66.67	3 1.1 1.11 2.04 100.00	1 0.0 0.37 0.68 50.00	98 0.1 36.30 66.67 56.00	0 0.5 0.00 0.00 0.00	5 0.4 1.85 3.40 71.43	1 0.4 0.37 0.68 100.00	2 0.8 0.74 1.36 100.00	4 0.2 1.48 2.72 66.67	147 54.44
TOTAL	61 22.59	12 4.44	3 1.11	2 0.74	175 64.81	1 0.37	7 2.59	1 0.37	2 0.74	6 2.22	270 100.00

STATISTICAL ANALYSIS SYSTEM 22:28 WEDNESDAY, DECEMBER 21, 1977 88

YR=76 SEASON=FALL ZONE=3

TABLE OF SPECIES BY INV

SPECIES / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	12	13	14	15	16	18	19	20	21	23	24	TOTAL
1	0 0.4 0.00 0.00 0.00	2 0.0 0.36 2.86 11.76	1 0.1 0.18 1.43 9.09	1 2.2 0.18 1.43 50.00	0 0.1 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	1 0.9 0.18 1.43 5.00	1 1.0 0.18 1.43 33.33	0 0.1 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	1 0.0 0.18 1.43 14.29	70 12.73
2	1 1.3 0.18 1.61 33.33	2 0.0 0.36 3.23 11.76	1 0.0 0.18 1.61 9.09	0 0.2 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	1 7.0 0.18 1.61 100.00	2 0.0 0.36 3.23 10.00	0 0.3 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	1 0.1 0.18 1.61 14.29	62 11.27
3	1 0.9 0.18 1.33 33.33	2 0.0 0.36 2.67 11.76	2 0.2 0.36 2.67 18.18	0 0.3 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	2 0.2 0.36 2.67 10.00	0 0.4 0.00 0.00 0.00	1 5.5 0.18 1.33 100.00	0 0.1 0.00 0.00 0.00	0 1.0 0.00 0.00 0.00	75 13.64
4	1 0.9 0.18 1.39 33.33	4 1.4 0.73 5.56 23.53	2 0.2 0.36 2.78 18.18	0 0.3 0.00 0.00 0.00	1 5.8 0.18 1.39 100.00	0 0.1 0.00 0.00 0.00	2 0.1 0.36 2.78 10.00	0 0.4 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	1 0.0 0.18 1.39 14.29	72 13.09
5	0 0.4 0.00 0.00 0.00	4 1.9 0.73 6.06 23.53	1 0.1 0.18 1.52 9.09	0 0.2 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	4 1.1 0.73 6.06 20.00	0 0.4 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	1 0.0 0.18 1.52 14.29	66 12.00
6	0 0.4 0.00 0.00 0.00	0 2.3 0.00 0.00 0.00	1 0.1 0.18 1.37 9.09	1 2.0 0.18 1.37 50.00	0 0.1 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	6 4.2 1.09 8.22 30.00	0 0.4 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	3 4.6 0.55 4.11 42.86	73 13.27
7	0 0.4 0.00 0.00 0.00	0 2.4 0.00 0.00 0.00	3 1.4 0.55 3.90 27.27	0 0.3 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	1 1.2 0.18 1.30 5.00	1 0.8 0.18 1.30 33.33	0 0.1 0.00 0.00 0.00	1 5.3 0.18 1.30 100.00	0 1.0 0.00 0.00 0.00	77 14.00
8	0 0.3 0.00 0.00 0.00	3 1.0 0.55 5.45 17.65	0 1.1 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	2 0.0 0.36 3.64 10.00	1 1.6 0.18 1.82 33.33	0 0.1 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 0.7 0.00 0.00 0.00	55 10.00
TOTAL	3 0.55	17 3.09	11 2.00	2 0.36	1 0.18	1 0.18	20 3.64	3 0.55	1 0.18	1 0.18	7 1.27	550 100.00

STATISTICAL ANALYSIS SYSTEM 22:28 WEDNESDAY, DECEMBER 21, 1977 91

YR=76 SEASON=FALL ZONE=3

TABLE OF FERT BY INV

FERT / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	1	2	3	4	5	6	7	8	9	10	TOTAL
1	29 0.2 5.27 25.00 19.33	22 0.0 4.00 18.97 20.95	3 0.7 0.55 2.59 13.04	17 0.1 3.09 14.66 19.54	2 0.2 0.36 1.72 28.57	1 0.0 0.18 0.86 20.00	10 0.1 1.82 8.62 19.23	3 1.6 0.55 2.59 42.86	11 0.8 2.00 9.48 27.50	0 0.8 0.00 0.00 0.00	2 3.0 0.36 1.72 66.67	116 21.09
2	31 1.1 5.64 32.98 20.67	14 0.9 2.55 14.89 13.33	3 0.2 0.55 3.19 13.04	15 0.0 2.73 15.96 17.24	1 0.0 0.18 1.06 14.29	1 0.0 0.18 1.06 20.00	12 1.1 2.18 12.77 23.08	2 0.5 0.36 2.13 28.57	6 0.1 1.09 6.38 15.00	0 0.7 0.00 0.00 0.00	0 0.5 0.00 0.00 0.00	94 17.09
3	17 5.4 3.09 15.60 11.33	31 5.0 5.64 28.44 29.52	4 0.1 0.73 3.67 17.39	16 0.1 2.91 14.68 18.39	1 0.1 0.18 0.92 14.29	1 0.0 0.18 0.92 20.00	10 0.0 1.82 9.17 19.23	0 1.4 0.00 0.00 0.00	10 0.5 1.82 9.17 25.00	1 0.1 0.18 0.92 25.00	0 0.6 0.00 0.00 0.00	109 19.82
4	42 4.5 7.64 37.84 28.00	16 1.3 2.91 14.41 15.24	5 0.0 0.91 4.50 21.74	13 1.2 2.36 11.71 14.94	2 0.2 0.36 1.80 28.57	1 0.0 0.18 0.90 20.00	10 0.0 1.82 9.01 19.23	1 0.1 0.18 0.90 14.29	7 0.1 1.27 6.31 17.50	3 6.0 0.55 2.70 75.00	0 0.6 0.00 0.00 0.00	111 20.18
5	31 0.1 5.64 25.83 20.67	22 0.0 4.00 18.33 20.95	8 1.8 1.45 6.67 34.78	26 2.6 4.73 21.67 29.89	1 0.2 0.18 0.83 14.29	1 0.0 0.18 0.83 20.00	10 0.2 1.82 8.33 19.23	1 0.2 0.18 0.83 14.29	6 0.9 1.09 5.00 15.00	0 0.9 0.00 0.00 0.00	1 0.2 0.18 0.83 33.33	120 21.82
TOTAL	150 27.27	105 19.09	23 4.18	87 15.82	7 1.27	5 0.91	52 9.45	7 1.27	40 7.27	4 0.73	3 0.55	550 100.00

(CONTINUED)

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   22:28 WEDNESDAY, DECEMBER 21, 1977   92

YR=76 SEASON=FALL ZONE=3

TABLE OF FERT BY INV

FERT / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	12	13	14	15	16	18	19	20	21	23	24	TOTAL
1	0 0.6 0.00 0.00 0.00	4 0.0 0.73 3.45 23.53	4 1.2 0.73 3.45 36.36	0 0.4 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	4 0.0 0.73 3.45 20.00	2 3.0 0.36 1.72 66.67	1 3.0 0.18 0.86 100.00	0 0.2 0.00 0.00 0.00	1 0.2 0.18 0.86 14.29	116 21.09
2	1 0.5 0.18 1.06 33.33	3 0.0 0.55 3.19 17.65	0 1.9 0.00 0.00 0.00	1 1.3 0.18 1.06 50.00	0 0.2 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	3 0.1 0.55 3.19 15.00	0 0.5 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	1 0.0 0.18 1.06 14.29	94 17.09
3	1 0.3 0.18 0.97 33.33	6 2.1 1.09 5.50 35.29	2 0.0 0.36 1.83 18.18	0 0.4 0.00 0.00 0.00	1 3.2 0.18 0.92 100.00	0 0.2 0.00 0.00 0.00	3 0.2 0.55 2.75 15.00	1 0.3 0.18 0.92 33.33	0 0.2 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	4 4.9 0.73 3.67 57.14	109 19.82
4	1 0.3 0.18 0.90 33.33	2 0.6 0.36 1.80 11.76	2 0.0 0.36 1.80 18.18	0 0.4 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	4 0.0 0.73 3.60 20.00	0 0.6 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	1 3.2 0.18 0.90 100.00	1 0.1 0.18 0.90 14.29	111 20.18
5	0 0.7 0.00 0.00 0.00	2 0.8 0.36 1.67 11.76	3 0.2 0.55 2.50 27.27	1 0.7 0.18 0.83 50.00	0 0.2 0.00 0.00 0.00	1 2.8 0.18 0.83 100.00	6 0.6 1.09 5.00 30.00	0 0.7 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	0 1.5 0.00 0.00 0.00	120 21.82
TOTAL	3 0.55	17 3.09	11 2.00	2 0.36	1 0.18	1 0.18	20 3.64	3 0.55	1 0.18	1 0.18	7 1.27	550 100.00

STATISTICAL ANALYSIS SYSTEM 22:28 WEDNESDAY, DECEMBER 21, 1977 94

YR=76 SEASON=FALL ZONE=3

TABLE OF PROP BY INV

PROP / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	1	2	3	4	5	6	7	8	9	10	TOTAL
1	80 1.2 14.55 30.89 53.33	44 0.6 8.00 16.99 41.90	3 5.7 0.55 1.16 13.04	30 2.9 5.45 11.58 34.48	4 0.2 0.73 1.54 57.14	1 0.8 0.18 0.39 20.00	27 0.3 4.91 10.42 51.92	2 0.5 0.36 0.77 28.57	25 2.0 4.55 9.65 62.50	3 0.7 0.55 1.16 75.00	2 0.2 0.36 0.77 66.67	259 47.09
2	70 1.1 12.73 24.05 46.67	61 0.5 11.09 20.96 58.10	20 5.0 3.64 6.87 86.96	57 2.6 10.36 19.59 65.52	3 0.1 0.55 1.03 42.86	4 0.7 0.73 1.37 80.00	25 0.2 4.55 8.59 48.08	5 0.5 0.91 1.72 71.43	15 1.8 2.73 5.15 37.50	1 0.6 0.18 0.34 25.00	1 0.2 0.18 0.34 33.33	291 52.91
TOTAL	150 27.27	105 19.09	23 4.18	87 15.82	7 1.27	5 0.91	52 9.45	7 1.27	40 7.27	4 0.73	3 0.55	550 100.00

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(CONTINUED)

TABLE OF PROP BY INV

PROP / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	12	13	14	15	16	18	19	20	21	23	24	TOTAL
1	1 0.1 0.18 0.39 33.33	10 0.5 1.82 3.86 58.82	6 0.1 1.09 2.32 54.55	2 1.2 0.36 0.77 100.00	1 0.6 0.18 0.39 100.00	1 0.6 0.18 0.39 100.00	13 1.4 2.36 5.02 65.00	0 1.4 0.00 0.00 0.00	0 0.5 0.00 0.00 0.00	0 0.5 0.00 0.00 0.00	4 0.2 0.73 1.54 57.14	259 47.09
2	2 0.1 0.36 0.69 66.67	7 0.4 1.27 2.41 41.18	5 0.1 0.91 1.72 45.45	0 1.1 0.00 0.00 0.00	0 0.5 0.00 0.00 0.00	0 0.5 0.00 0.00 0.00	7 1.2 1.27 2.41 35.00	3 1.3 0.55 1.03 100.00	1 0.4 0.18 0.34 100.00	1 0.4 0.18 0.34 100.00	3 0.1 0.55 1.03 42.86	291 52.91
TOTAL	3 0.55	17 3.09	11 2.00	2 0.36	1 0.18	1 0.18	20 3.64	3 0.55	1 0.18	1 0.18	7 1.27	550 100.00

H32

YR=77   SEASON=SPRING   ZONE=3

TABLE OF SPECIES BY INV

SPECIES	INV: FREQUENCY / CELL CHI2 / PERCENT / ROW PCT / COL PCT	0	1	2	3	6	7	8	9	10	13	TOTAL
1	FREQUENCY	3	5	2	24	11	2	16	28	6	14	145
	CELL CHI2	0.7	0.6	4.0	0.3	0.9	1.5	16.3	0.8	5.0	0.4	
	PERCENT	0.26	0.43	0.17	2.05	0.94	0.17	1.37	2.39	0.51	1.20	12.38
	ROW PCT	2.07	3.45	1.38	16.55	7.59	1.38	11.03	19.31	4.14	9.66	
	COL PCT	7.69	8.77	3.33	13.87	16.42	28.57	32.65	10.41	30.00	14.74	
2	FREQUENCY	3	13	9	5	4	1	5	41	4	8	145
	CELL CHI2	0.7	5.0	0.3	12.6	2.2	0.0	0.2	1.8	0.9	1.2	
	PERCENT	0.26	1.11	0.77	0.43	0.34	0.09	0.43	3.50	0.34	0.68	12.38
	ROW PCT	2.07	8.97	6.21	3.45	2.76	0.69	3.45	28.28	2.76	5.52	
	COL PCT	7.69	22.81	15.00	2.89	5.97	14.29	10.20	15.24	20.00	8.42	
3	FREQUENCY	3	3	14	36	7	1	10	35	1	13	176
	CELL CHI2	1.4	3.6	2.8	3.8	0.9	0.0	0.9	0.7	1.3	0.1	
	PERCENT	0.26	0.26	1.20	3.07	0.60	0.09	0.85	2.99	0.09	1.11	15.03
	ROW PCT	1.70	1.70	7.95	20.45	3.98	0.57	5.68	19.89	0.57	7.39	
	COL PCT	7.69	5.26	23.33	20.81	10.45	14.29	20.41	13.01	5.00	13.68	
4	FREQUENCY	3	6	9	28	11	0	6	36	3	14	156
	CELL CHI2	0.9	0.3	0.1	1.1	0.5	0.9	0.0	0.0	0.0	0.1	
	PERCENT	0.26	0.51	0.77	2.39	0.94	0.00	0.51	3.07	0.26	1.20	13.32
	ROW PCT	1.92	3.85	5.77	17.95	7.05	0.00	3.85	23.08	1.92	8.97	
	COL PCT	7.69	10.53	15.00	16.18	16.42	0.00	12.24	13.38	15.00	14.74	
5	FREQUENCY	10	6	3	23	1	0	4	25	1	12	131
	CELL CHI2	7.3	0.0	2.1	0.7	5.6	0.8	0.4	0.9	0.7	0.2	
	PERCENT	0.85	0.51	0.26	1.96	0.09	0.00	0.34	2.13	0.09	1.02	11.19
	ROW PCT	7.63	4.58	2.29	17.56	0.76	0.00	3.05	19.08	0.76	9.16	
	COL PCT	25.64	10.53	5.00	13.29	1.49	0.00	8.16	9.29	5.00	12.63	
6	FREQUENCY	5	13	8	20	9	2	2	37	1	12	144
	CELL CHI2	0.0	5.1	0.1	0.1	0.1	1.5	2.7	0.5	0.9	0.0	
	PERCENT	0.43	1.11	0.68	1.71	0.77	0.17	0.17	3.16	0.09	1.02	12.30

YR=77 SEASON=SPRING ZONE=2

TABLE OF PROP BY INV

PROP / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	1	2	3	5	6	7	9	13	14	TOTAL
1	47 3.2 8.74 18.29 61.84	3 1.7 0.56 1.17 100.00	0 0.5 0.00 0.00 0.00	1 0.0 0.19 0.39 50.00	0 0.5 0.00 0.00 0.00	102 0.0 18.96 39.69 48.57	2 0.5 0.37 0.78 28.57	70 0.4 13.01 27.24 44.30	5 1.6 0.93 1.95 83.33	6 0.0 1.12 2.33 46.15	257 47.77
2	29 2.9 5.39 10.32 38.16	0 1.6 0.00 0.00 0.00	1 0.4 0.19 0.36 100.00	1 0.0 0.19 0.36 50.00	1 0.4 0.19 0.36 100.00	108 0.0 20.07 38.43 51.43	5 0.5 0.93 1.78 71.43	88 0.4 16.36 31.32 55.70	1 1.5 0.19 0.36 16.67	7 0.0 1.30 2.49 53.85	281 52.23
TOTAL	76 14.13	3 0.56	1 0.19	2 0.37	1 0.19	210 39.03	7 1.30	158 29.37	6 1.12	13 2.42	538 100.00

(CONTINUED)

TABLE OF PROP BY INV

PROP / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	15	16	17	19	22	23	24	25	26	TOTAL
1	2 1.1 0.37 0.78 100.00	0 1.4 0.00 0.00 0.00	1 0.6 0.19 0.39 100.00	2 3.3 0.37 0.78 14.29	2 0.2 0.37 0.78 66.67	0 1.4 0.00 0.00 0.00	4 0.8 0.74 1.56 30.77	10 0.0 1.86 3.89 47.62	0 0.5 0.00 0.00 0.00	257 47.77
2	0 1.0 0.00 0.00 0.00	3 1.3 0.56 1.07 100.00	0 0.5 0.00 0.00 0.00	12 3.0 2.23 4.27 85.71	1 0.2 0.19 0.36 33.33	3 1.3 0.56 1.07 100.00	9 0.7 1.67 3.20 69.23	11 0.0 2.04 3.91 52.38	1 0.4 0.19 0.36 100.00	281 52.23
TOTAL	2 0.37	3 0.56	1 0.19	14 2.60	3 0.56	3 0.56	13 2.42	21 3.90	1 0.19	538 100.00

YR=77 SEASON=SPRING ZONE=2

TABLE OF FERT BY INV

FERT / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	1	2	3	5	6	7	9	13	14	TOTAL
1	13 0.1 2.42 13.00 17.11	1 0.4 0.19 1.00 33.33	0 0.2 0.00 0.00 0.00	0 0.4 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	41 0.1 7.62 41.00 19.52	0 1.3 0.00 0.00 0.00	30 0.0 5.58 30.00 18.99	1 0.0 0.19 1.00 16.67	3 0.1 0.56 3.00 23.08	100 18.59
2	12 0.4 2.23 11.76 15.79	1 0.3 0.19 0.98 33.33	1 3.5 0.19 0.98 100.00	0 0.4 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	44 0.4 8.18 43.14 20.95	0 1.3 0.00 0.00 0.00	26 0.5 4.83 25.49 16.46	0 1.1 0.00 0.00 0.00	3 0.1 0.56 2.94 23.08	102 18.96
3	17 0.5 3.16 16.83 22.37	1 0.3 0.19 0.99 33.33	0 0.2 0.00 0.00 0.00	1 1.0 0.19 0.99 50.00	0 0.2 0.00 0.00 0.00	38 0.1 7.06 37.62 18.10	2 0.4 0.37 1.98 28.57	29 0.0 5.39 28.71 18.35	1 0.0 0.19 0.99 16.67	2 0.1 0.37 1.98 15.38	101 18.77
4	17 0.0 3.16 13.49 22.37	0 0.7 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	1 0.6 0.19 0.79 50.00	0 0.2 0.00 0.00 0.00	41 1.4 7.62 32.54 19.52	5 6.9 0.93 3.97 71.43	37 0.0 6.88 29.37 23.42	3 1.8 0.56 2.38 50.00	3 0.0 0.56 2.38 23.08	126 23.42
5	17 0.2 3.16 15.60 22.37	0 0.6 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	0 0.4 0.00 0.00 0.00	1 3.1 0.19 0.92 100.00	46 0.3 8.55 42.20 21.90	0 1.4 0.00 0.00 0.00	36 0.5 6.69 33.03 22.78	1 0.0 0.19 0.92 16.67	2 0.2 0.37 1.83 15.38	109 20.26
TOTAL	76 14.13	3 0.56	1 0.19	2 0.37	1 0.19	210 39.03	7 1.30	158 29.37	6 1.12	13 2.42	538 100.00

(CONTINUED)

YR=77 SEASON=SPRING ZONE=2

TABLE OF FERT BY INV

FERT / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	15	16	17	19	22	23	24	25	26	TOTAL
1	1 1.1 0.19 1.00 50.00	0 0.6 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	0 2.6 0.00 0.00 0.00	1 0.4 0.19 1.00 33.33	0 0.6 0.00 0.00 0.00	4 1.0 0.74 4.00 30.77	5 0.3 0.93 5.00 23.81	0 0.2 0.00 0.00 0.00	100 18.59
2	1 1.0 0.19 0.98 50.00	1 0.3 0.19 0.98 33.33	0 0.2 0.00 0.00 0.00	6 4.2 1.12 5.88 42.86	1 0.3 0.19 0.98 33.33	0 0.6 0.00 0.00 0.00	3 0.1 0.56 2.94 23.08	3 0.2 0.56 2.94 14.29	0 0.2 0.00 0.00 0.00	102 18.96
3	0 0.4 0.00 0.00 0.00	0 0.6 0.00 0.00 0.00	1 3.5 0.19 0.99 100.00	1 1.0 0.19 0.99 7.14	0 0.6 0.00 0.00 0.00	0 0.6 0.00 0.00 0.00	3 0.1 0.56 2.97 23.08	5 0.3 0.93 4.95 23.81	0 0.2 0.00 0.00 0.00	101 18.77
4	0 0.5 0.00 0.00 0.00	2 2.4 0.37 1.59 66.67	0 0.2 0.00 0.00 0.00	7 4.2 1.30 5.56 50.00	1 0.1 0.19 0.79 33.33	2 2.4 0.37 1.59 66.67	2 0.4 0.37 1.59 15.38	4 0.2 0.74 3.17 19.05	1 2.5 0.19 0.79 100.00	126 23.42
5	0 0.4 0.00 0.00 0.00	0 0.6 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	0 2.8 0.00 0.00 0.00	0 0.6 0.00 0.00 0.00	1 0.3 0.19 0.92 33.33	1 1.0 0.19 0.92 7.69	4 0.0 0.74 3.67 19.05	0 0.2 0.00 0.00 0.00	109 20.26
TOTAL	2 0.37	3 0.56	1 0.19	14 2.60	3 0.56	3 0.56	13 2.42	21 3.90	1 0.19	538 100.00

YR=77   SEASON=SPRING   ZONE=2

TABLE OF SPECIES BY INV

SPECIES / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	15	16	17	19	22	23	24	25	26	TOTAL
1	0 0.3 0.00 0.00 0.00	0 0.4 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	2 0.0 0.37 2.67 14.29	1 0.8 0.19 1.33 33.33	0 0.4 0.00 0.00 0.00	2 0.0 0.37 2.67 15.38	2 0.3 0.37 2.67 9.52	0 0.1 0.00 0.00 0.00	75 13.94
2	0 0.3 0.00 0.00 0.00	1 0.9 0.19 1.37 33.33	1 5.5 0.19 1.37 100.00	3 0.6 0.56 4.11 21.43	0 0.4 0.00 0.00 0.00	1 0.9 0.19 1.37 33.33	2 0.0 0.37 2.74 15.38	3 0.0 0.56 4.11 14.29	0 0.1 0.00 0.00 0.00	73 13.57
3	1 2.3 0.19 1.52 50.00	0 0.4 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 1.7 0.00 0.00 0.00	1 1.1 0.19 1.52 33.33	0 0.4 0.00 0.00 0.00	1 0.2 0.19 1.52 7.69	2 0.1 0.37 3.03 9.52	0 0.1 0.00 0.00 0.00	66 12.27
4	0 0.2 0.00 0.00 0.00	0 0.3 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	1 0.1 0.19 1.79 7.14	1 1.5 0.19 1.79 33.33	0 0.3 0.00 0.00 0.00	2 0.3 0.37 3.57 15.38	1 0.6 0.19 1.79 4.76	0 0.1 0.00 0.00 0.00	56 10.41
5	1 2.7 0.19 1.67 50.00	0 0.3 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 1.6 0.00 0.00 0.00	0 0.3 0.00 0.00 0.00	0 0.3 0.00 0.00 0.00	3 1.7 0.56 5.00 23.08	3 0.2 0.56 5.00 14.29	0 0.1 0.00 0.00 0.00	60 11.15
6	0 0.2 0.00 0.00 0.00	0 0.4 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 1.7 0.00 0.00 0.00	0 0.4 0.00 0.00 0.00	1 1.1 0.19 1.49 33.33	0 1.6 0.00 0.00 0.00	4 0.7 0.74 5.97 19.05	1 6.2 0.19 1.49 100.00	67 12.45
7	0 0.2 0.00 0.00 0.00	0 0.4 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	4 3.2 0.74 6.15 28.57	0 0.4 0.00 0.00 0.00	0 0.4 0.00 0.00 0.00	2 0.1 0.37 3.08 15.38	6 4.7 1.12 9.23 28.57	0 0.1 0.00 0.00 0.00	65 12.08
8	0 0.3 0.00 0.00 0.00	2 5.9 0.37 2.63 66.67	0 0.1 0.00 0.00 0.00	4 2.1 0.74 5.26 28.57	0 0.4 0.00 0.00 0.00	1 0.8 0.19 1.32 33.33	1 0.4 0.19 1.32 7.69	0 3.0 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	76 14.13
TOTAL	2 0.37	3 0.56	1 0.19	14 2.60	3 0.56	3 0.56	13 2.42	21 3.90	1 0.19	538 100.00

STATISTICAL ANALYSIS SYSTEM 22:28 WEDNESDAY, DECEMBER 21, 1977

YR=77 SEASON=SPRING ZONE=2

TABLE OF SPECIES BY INV

SPECIES	INV	0	1	2	3	5	6	7	9	13	14	TOTAL
1	FREQUENCY	7	0	1	1	1	34	1	19	2	2	75
	CELL CHI2	1.2	0.4	5.3	1.9	5.3	0.8	0.0	0.4	1.6	0.0	
	PERCENT	1.30	0.00	0.19	0.19	0.19	6.32	0.19	3.53	0.37	0.37	13.94
	ROW PCT	9.33	0.00	1.33	1.33	1.33	45.33	1.33	25.33	2.67	2.67	
	COL PCT	9.21	0.00	100.00	50.00	100.00	16.19	14.29	12.03	33.33	15.38	
2	FREQUENCY	8	0	0	1	0	27	1	20	2	3	73
	CELL CHI2	0.5	0.4	0.1	2.0	0.1	0.1	0.0	0.1	1.7	0.9	
	PERCENT	1.49	0.00	0.00	0.19	0.00	5.02	0.19	3.72	0.37	0.56	13.57
	ROW PCT	10.96	0.00	0.00	1.37	0.00	36.99	1.37	27.40	2.74	4.11	
	COL PCT	10.53	0.00	0.00	50.00	0.00	12.86	14.29	12.66	33.33	23.08	
3	FREQUENCY	7	0	0	0	0	37	0	16	0	1	66
	CELL CHI2	0.6	0.4	0.1	0.2	0.1	4.9	0.9	0.6	0.7	0.2	
	PERCENT	1.30	0.00	0.00	0.00	0.00	6.88	0.00	2.97	0.00	0.19	12.27
	ROW PCT	10.61	0.00	0.00	0.00	0.00	56.06	0.00	24.24	0.00	1.52	
	COL PCT	9.21	0.00	0.00	0.00	0.00	17.62	0.00	10.13	0.00	7.69	
4	FREQUENCY	8	0	0	0	0	24	1	17	0	1	56
	CELL CHI2	0.0	0.3	0.1	0.2	0.1	0.2	0.1	0.0	0.6	0.1	
	PERCENT	1.49	0.00	0.00	0.00	0.00	4.46	0.19	3.16	0.00	0.19	10.41
	ROW PCT	14.29	0.00	0.00	0.00	0.00	42.86	1.79	30.36	0.00	1.79	
	COL PCT	10.53	0.00	0.00	0.00	0.00	11.43	14.29	10.76	0.00	7.69	
5	FREQUENCY	24	0	0	0	0	3	0	24	0	2	60
	CELL CHI2	28.4	0.3	0.1	0.2	0.1	17.8	0.8	2.3	0.7	0.2	
	PERCENT	4.46	0.00	0.00	0.00	0.00	0.56	0.00	4.46	0.00	0.37	11.15
	ROW PCT	40.00	0.00	0.00	0.00	0.00	5.00	0.00	40.00	0.00	3.33	
	COL PCT	31.58	0.00	0.00	0.00	0.00	1.43	0.00	15.19	0.00	15.38	
6	FREQUENCY	12	1	0	0	0	28	1	19	0	0	67
	CELL CHI2	0.7	1.1	0.1	0.2	0.1	0.1	0.0	0.0	0.7	1.6	
	PERCENT	2.23	0.19	0.00	0.00	0.00	5.20	0.19	3.53	0.00	0.00	12.45
	ROW PCT	17.91	1.49	0.00	0.00	0.00	41.79	1.49	28.36	0.00	0.00	
	COL PCT	15.79	33.33	0.00	0.00	0.00	13.33	14.29	12.03	0.00	0.00	
7	FREQUENCY	6	1	0	0	0	25	0	18	2	1	65
	CELL CHI2	1.1	1.1	0.1	0.2	0.1	0.0	0.8	0.1	2.2	0.2	
	PERCENT	1.12	0.19	0.00	0.00	0.00	4.65	0.00	3.35	0.37	0.19	12.08
	ROW PCT	9.23	1.54	0.00	0.00	0.00	38.46	0.00	27.69	3.08	1.54	
	COL PCT	7.89	33.33	0.00	0.00	0.00	11.90	0.00	11.39	33.33	7.69	
8	FREQUENCY	4	1	0	0	0	32	3	25	0	3	76
	CELL CHI2	4.2	0.8	0.1	0.3	0.1	0.2	4.1	0.3	0.8	0.7	
	PERCENT	0.74	0.19	0.00	0.00	0.00	5.95	0.56	4.65	0.00	0.56	14.13
	ROW PCT	5.26	1.32	0.00	0.00	0.00	42.11	3.95	32.89	0.00	3.95	
	COL PCT	5.26	33.33	0.00	0.00	0.00	15.24	42.86	15.82	0.00	23.08	
TOTAL		76	3	1	2	1	210	7	158	6	13	538
		14.13	0.56	0.19	0.37	0.19	39.03	1.30	29.37	1.12	2.42	100.00

(CONTINUED)

YR=77 SEASON=SPRING ZONE=1

TABLE OF PROP BY INV

PROP / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	6	TOTAL
1	8 0.3 66.67 80.00 100.00	2 0.5 16.67 20.00 50.00	10 83.33
2	0 1.3 0.00 0.00 0.00	2 2.7 16.67 100.00 50.00	2 16.67
TOTAL	8 66.67	4 33.33	12 100.00

YR=77   SEASON=SPRING   ZONE=1

TABLE OF FERT BY INV

FERT / INV (FREQUENCY, CELL CHI2, PERCENT, ROW PCT, COL PCT)	0	6	TOTAL
1	2 0.3 16.67 100.00 25.00	0 0.7 0.00 0.00 0.00	2 16.67
2	2 0.0 16.67 66.67 25.00	1 0.0 8.33 33.33 25.00	3 25.00
3	0 1.3 0.00 0.00 0.00	2 2.7 16.67 100.00 50.00	2 16.67
5	4 0.1 33.33 80.00 50.00	1 0.3 8.33 20.00 25.00	5 41.67
TOTAL	8 66.67	4 33.33	12 100.00

STATISTICAL ANALYSIS SYSTEM 22:28 WEDNESDAY

YR=77 SEASON=SPRING ZONE=1

TABLE OF SPECIES BY INV

SPECIES / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	6	TOTAL
2	0 0.7 0.00 0.00 0.00	1 1.3 8.33 100.00 25.00	1 8.33
4	0 0.7 0.00 0.00 0.00	1 1.3 8.33 100.00 25.00	1 8.33
5	8 1.3 66.67 100.00 100.00	0 2.7 0.00 0.00 0.00	8 66.67
6	0 0.7 0.00 0.00 0.00	1 1.3 8.33 100.00 25.00	1 8.33
8	0 0.7 0.00 0.00 0.00	1 1.3 8.33 100.00 25.00	1 8.33
TOTAL	8 66.67	4 33.33	12 100.00

STATISTICAL ANALYSIS SYSTEM 22:28 WEDNESDAY, DECEMBER 21, 1977 51

YR=77 SEASON=SPRING

TABLE OF ZONE BY INV

ZONE / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	1	2	3	5	6	7	8	9	10	13	14	TOTAL
1	8 59.5 0.46 66.67 6.50	0 0.4 0.00 0.00 0.00	0 0.4 0.00 0.00 0.00	0 1.2 0.00 0.00 0.00	0 0.0 0.00 0.00 0.00	4 2.1 0.23 33.33 1.42	0 0.1 0.00 0.00 0.00	0 0.3 0.00 0.00 0.00	0 3.0 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 0.7 0.00 0.00 0.00	0 0.5 0.00 0.00 0.00	12 0.70
2	76 36.7 4.42 14.13 61.79	3 13.2 0.17 0.56 5.00	1 17.1 0.06 0.19 1.64	2 50.8 0.12 0.37 1.14	1 1.5 0.06 0.19 100.00	210 169.9 12.20 39.03 74.73	7 1.6 0.41 1.30 50.00	0 15.3 0.00 0.00 0.00	158 4.5 9.18 29.37 37.00	0 6.3 0.00 0.00 0.00	6 20.7 0.35 1.12 5.94	13 2.8 0.76 2.42 19.70	538 31.26
3	39 23.9 2.27 3.33 31.71	57 6.4 3.31 4.87 95.00	60 8.2 3.49 5.12 98.36	173 24.4 10.05 14.77 98.86	0 0.7 0.00 0.00 0.00	67 80.7 3.89 5.72 23.84	7 0.7 0.41 0.60 50.00	49 7.4 2.85 4.18 100.00	269 1.6 15.63 22.97 63.00	20 3.0 1.16 1.71 100.00	95 [illegible] 5.52 8.11 94.06	53 1.5 3.08 4.53 80.30	1171 68.04
TOTAL	123 7.15	60 3.49	61 3.54	175 10.17	1 0.06	281 16.33	14 0.81	49 2.85	427 24.81	20 1.16	101 5.87	66 3.83	1721 100.00

(CONTINUED)

STATISTICAL ANALYSIS SYSTEM 22:28 WEDNESDAY, DECEMBER 21, 1977 52

YR=77 SEASON=SPRING

TABLE OF ZONE BY INV

ZONE	INV: FREQUENCY / CELL CHI2 / PERCENT / ROW PCT / COL PCT	15	16	17	18	19	20	22	23	24	25	26	27	TOTAL
1	FREQUENCY	0	0	0	0	0	0	0	0	0	0	0	0	12
	CELL CHI2	0.2	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.6	0.9	0.1	0.0	0.70
	PERCENT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	ROW PCT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	COL PCT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	FREQUENCY	2	3	1	0	14	0	3	3	13	21	1	0	538
	CELL CHI2	7.0	2.4	1.5	0.6	2.8	0.3	4.5	4.5	5.8	7.7	3.5	1.9	31.26
	PERCENT	0.12	0.17	0.06	0.00	0.81	0.00	0.17	0.17	0.76	1.22	0.06	0.00	
	ROW PCT	0.37	0.56	0.19	0.00	2.60	0.00	0.56	0.56	2.42	3.90	0.19	0.00	
	COL PCT	5.88	75.00	100.00	0.00	20.00	0.00	100.00	100.00	16.25	17.21	5.88	0.00	
3	FREQUENCY	32	1	0	2	56	1	0	0	67	101	16	6	1171
	CELL CHI2	3.4	1.1	0.7	0.3	1.5	0.2	2.3	2.0	2.9	3.9	1.7	0.9	68.04
	PERCENT	1.86	0.06	0.00	0.12	3.25	0.06	0.00	0.00	3.89	5.87	0.93	0.35	
	ROW PCT	2.73	0.09	0.00	0.17	4.78	0.09	0.00	0.00	5.72	8.63	1.37	0.51	
	COL PCT	94.12	25.00	0.00	100.00	80.00	100.00	0.00	0.00	83.75	82.79	94.12	100.00	
TOTAL		34	4	1	2	70	1	3	3	80	122	17	6	1721
		1.98	0.23	0.06	0.12	4.07	0.06	0.17	0.17	4.65	7.09	0.99	0.35	100.00

YR=77 SEASON=SPRING ZONE=1

TABLE OF SPECIES BY INV

SPECIES / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	6	TOTAL
2	0 0.7 0.00 0.00 0.00	1 1.3 8.33 100.00 25.00	1 8.33
4	0 0.7 0.00 0.00 0.00	1 1.3 8.33 100.00 25.00	1 8.33
5	8 1.3 66.67 100.00 100.00	0 2.7 0.00 0.00 0.00	8 66.67
6	0 0.7 0.00 0.00 0.00	1 1.3 8.33 100.00 25.00	1 8.33
8	0 0.7 0.00 0.00 0.00	1 1.3 8.33 100.00 25.00	1 8.33
TOTAL	8 66.67	4 33.33	12 100.00

1

YR=77   SEASON=SPRING   ZONE=1

TABLE OF FERT BY INV

FERT / INV (FREQUENCY, CELL CHI2, PERCENT, ROW PCT, COL PCT)	0	6	TOTAL
1	2 0.3 16.67 100.00 25.00	0 0.7 0.00 0.00 0.00	2 16.67
2	2 0.0 16.67 66.67 25.00	1 0.0 8.33 33.33 25.00	3 25.00
3	0 1.3 0.00 0.00 0.00	2 2.7 16.67 100.00 50.00	2 16.67
5	4 0.1 33.33 80.00 50.00	1 0.3 8.33 20.00 25.00	5 41.67
TOTAL	8 66.67	4 33.33	12 100.00

STATISTICAL ANALYSIS SYSTEM 1:09 THURSDAY, DECEMBER 22, 1977 18

YR=77 SEASON=SPRING ZONE=1

TABLE OF PROP BY INV

PROP / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	6	TOTAL
1	8 0.3 66.67 80.00 100.00	2 0.5 16.67 20.00 50.00	10 83.33
2	0 1.3 0.00 0.00 0.00	2 2.7 16.67 100.00 50.00	2 16.67
TOTAL	8 66.67	4 33.33	12 100.00

YR=77   SEASON=SPRING   ZONE=2

TABLE OF SPECIES BY INV

SPECIES / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	1	2	3	5	6	7	9	13	14	TOTAL
1	7 1.2 1.30 9.33 9.21	0 0.4 0.00 0.00 0.00	1 5.3 0.19 1.33 100.00	1 1.9 0.19 1.33 50.00	1 5.3 0.19 1.33 100.00	34 0.8 6.32 45.33 16.19	1 0.0 0.19 1.33 14.29	19 0.4 3.53 25.33 12.03	2 1.6 0.37 2.67 33.33	2 0.0 0.37 2.67 15.38	75 13.94
2	8 0.5 1.49 10.96 10.53	0 0.4 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	1 2.0 0.19 1.37 50.00	0 0.1 0.00 0.00 0.00	27 0.1 5.02 36.99 12.86	1 0.0 0.19 1.37 14.29	20 0.1 3.72 27.40 12.66	2 1.7 0.37 2.74 33.33	3 0.9 0.56 4.11 23.08	73 13.57
3	7 0.6 1.30 10.61 9.21	0 0.4 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	37 4.9 6.88 56.06 17.62	0 0.9 0.00 0.00 0.00	16 0.6 2.97 24.24 10.13	0 0.7 0.00 0.00 0.00	1 0.2 0.19 1.52 7.69	66 12.27
4	8 0.0 1.49 14.29 10.53	0 0.3 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	24 0.2 4.46 42.86 11.43	1 0.1 0.19 1.79 14.29	17 0.0 3.16 30.36 10.76	0 0.6 0.00 0.00 0.00	1 0.1 0.19 1.79 7.69	56 10.41
5	24 28.4 4.46 40.00 31.58	0 0.3 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	3 17.8 0.56 5.00 1.43	0 0.8 0.00 0.00 0.00	24 2.3 4.46 40.00 15.19	0 0.7 0.00 0.00 0.00	2 0.2 0.37 3.33 15.38	60 11.15
6	12 0.7 2.23 17.91 15.79	1 1.1 0.19 1.49 33.33	0 0.1 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	28 0.1 5.20 41.79 13.33	1 0.0 0.19 1.49 14.29	19 0.0 3.53 28.36 12.03	0 0.7 0.00 0.00 0.00	0 1.6 0.00 0.00 0.00	67 12.45
7	6 1.1 1.12 9.23 7.89	1 1.1 0.19 1.54 33.33	0 0.1 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	25 0.0 4.65 38.46 11.90	0 0.8 0.00 0.00 0.00	18 0.1 3.35 27.69 11.39	2 2.2 0.37 3.08 33.33	1 0.2 0.19 1.54 7.69	65 12.08
8	4 4.2 0.74 5.26 5.26	1 0.8 0.19 1.32 33.33	0 0.1 0.00 0.00 0.00	0 0.3 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	32 0.2 5.95 42.11 15.24	3 4.1 0.56 3.95 42.86	25 0.3 4.65 32.89 15.82	0 0.8 0.00 0.00 0.00	3 0.7 0.56 3.95 23.08	76 14.13
TOTAL	76 14.13	3 0.56	1 0.19	2 0.37	1 0.19	210 39.03	7 1.30	158 29.37	6 1.12	13 2.42	538 100.00

(CONTINUED)

YR=77   SEASON=SPRING   ZONE=2

TABLE OF SPECIES BY INV

SPECIES / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	15	16	17	19	22	23	24	25	26	TOTAL
1	0 0.3 0.00 0.00 0.00	0 0.4 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	2 0.0 0.37 2.67 14.29	1 0.8 0.19 1.33 33.33	0 0.4 0.00 0.00 0.00	2 0.0 0.37 2.67 15.38	2 0.3 0.37 2.67 9.52	0 0.1 0.00 0.00 0.00	75 13.94
2	0 0.3 0.00 0.00 0.00	1 0.9 0.19 1.37 33.33	1 5.5 0.19 1.37 100.00	3 0.6 0.56 4.11 21.43	0 0.4 0.00 0.00 0.00	1 0.9 0.19 1.37 33.33	2 0.0 0.37 2.74 15.38	3 0.0 0.56 4.11 14.29	0 0.1 0.00 0.00 0.00	73 13.57
3	1 2.3 0.19 1.52 50.00	0 0.4 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 1.7 0.00 0.00 0.00	1 1.1 0.19 1.52 33.33	0 0.4 0.00 0.00 0.00	1 0.2 0.19 1.52 7.69	2 0.1 0.37 3.03 9.52	0 0.1 0.00 0.00 0.00	66 12.27
4	0 0.2 0.00 0.00 0.00	0 0.3 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	1 0.1 0.19 1.79 7.14	1 1.5 0.19 1.79 33.33	0 0.3 0.00 0.00 0.00	2 0.3 0.37 3.57 15.38	1 0.6 0.19 1.79 4.76	0 0.1 0.00 0.00 0.00	56 10.41
TOTAL	2 0.37	3 0.56	1 0.19	14 2.60	3 0.56	3 0.56	13 2.42	21 3.90	1 0.19	538 100.00

(CONTINUED)

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S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   1:09 THURSDAY, DECEMBER 22, 1977 [23]

YR=77   SEASON=SPRING   ZONE=2

TABLE OF SPECIES BY INV

SPECIES / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	15	16	17	19	22	23	24	25	26	TOTAL
5	1 2.7 0.19 1.67 50.00	0 0.3 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 1.6 0.00 0.00 0.00	0 0.3 0.00 0.00 0.00	0 0.3 0.00 0.00 0.00	3 1.7 0.56 5.00 23.08	3 0.2 0.56 5.00 14.29	0 0.1 0.00 0.00 0.00	60 11.15
6	0 0.2 0.00 0.00 0.00	0 0.4 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 1.7 0.00 0.00 0.00	0 0.4 0.00 0.00 0.00	1 1.1 0.19 1.49 33.33	0 1.6 0.00 0.00 0.00	4 0.7 0.74 5.97 19.05	1 6.2 0.19 1.49 100.00	67 12.45
7	0 0.2 0.00 0.00 0.00	0 0.4 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	4 3.2 0.74 6.15 28.57	0 0.4 0.00 0.00 0.00	0 0.4 0.00 0.00 0.00	2 0.1 0.37 3.08 15.38	6 4.7 1.12 9.23 28.57	0 0.1 0.00 0.00 0.00	65 12.08
8	0 0.3 0.00 0.00 0.00	2 5.9 0.37 2.63 66.67	0 0.1 0.00 0.00 0.00	4 2.1 0.74 5.26 28.57	0 0.4 0.00 0.00 0.00	1 0.8 0.19 1.32 33.33	1 0.4 0.19 1.32 7.69	0 3.0 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	76 14.13
TOTAL	2 0.37	3 0.56	1 0.19	14 2.60	3 0.56	3 0.56	13 2.42	21 3.90	1 0.19	538 100.00

AD-A062 867 GEORGIA UNIV BRUNSWICK MARINE EXTENSION SERVICE F/G 13/2
HABITAT DEVELOPMENT FIELD INVESTIGATIONS BUTTERMILK SOUND MARSH--ETC(U)
JUL 78 R J REIMOLD, M A HARDISKY, P C ADAMS DACW21-75-C-0074
UNCLASSIFIED WES-TR-D-78-26-APP-A NL

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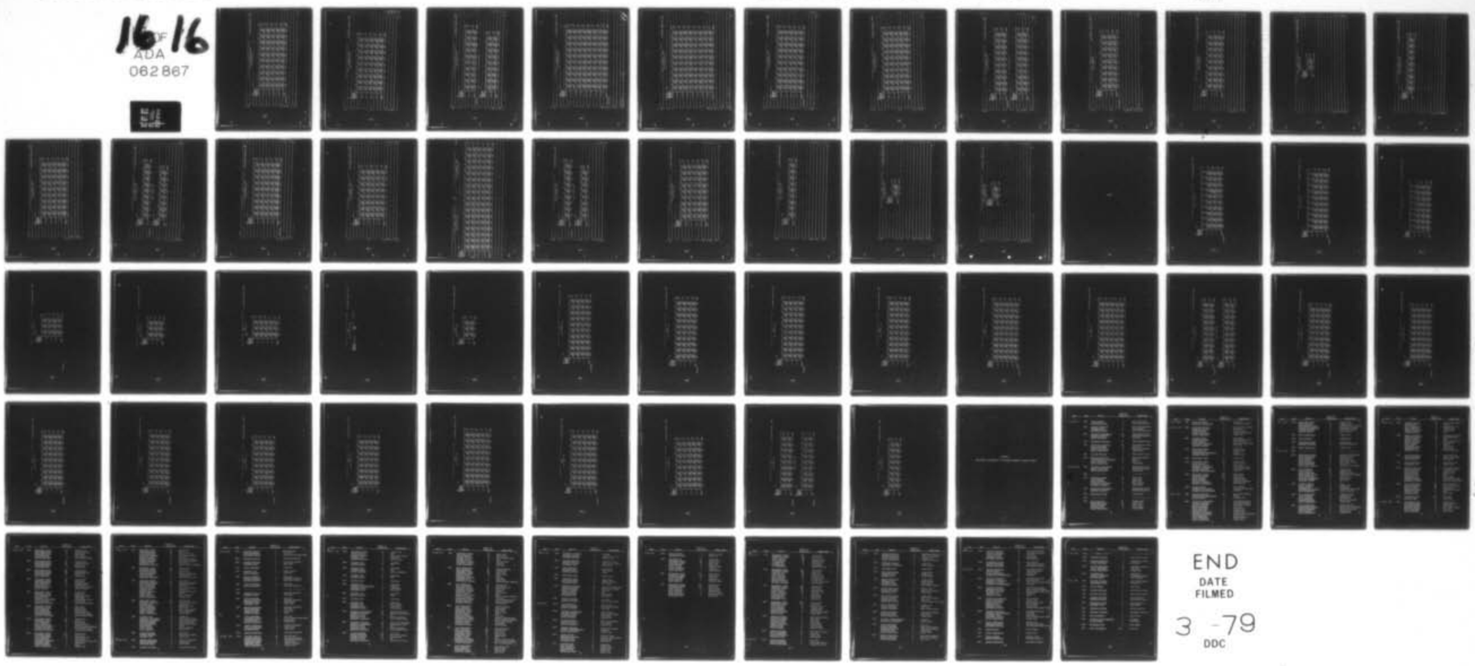

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YR=77 SEASON=SPRING ZONE=2

TABLE OF FERT BY INV

FERT	FREQUENCY / CELL CHI2 / PERCENT / ROW PCT / COL PCT	INV 0	1	2	3	5	6	7	9	13	14	TOTAL
1	FREQUENCY	13	1	0	0	0	41	0	30	1	3	100
	CELL CHI2	0.1	0.4	0.2	0.4	0.2	0.1	1.3	0.0	0.0	0.1	
	PERCENT	2.42	0.19	0.00	0.00	0.00	7.62	0.00	5.58	0.19	0.56	18.59
	ROW PCT	13.00	1.00	0.00	0.00	0.00	41.00	0.00	30.00	1.00	3.00	
	COL PCT	17.11	33.33	0.00	0.00	0.00	19.52	0.00	18.99	16.67	23.08	
2	FREQUENCY	12	1	1	0	0	44	0	26	0	3	102
	CELL CHI2	0.4	0.3	3.5	0.4	0.2	0.4	1.3	0.5	1.1	0.1	
	PERCENT	2.23	0.19	0.19	0.00	0.00	8.18	0.00	4.83	0.00	0.56	18.96
	ROW PCT	11.76	0.98	0.98	0.00	0.00	43.14	0.00	25.49	0.00	2.94	
	COL PCT	15.79	33.33	100.00	0.00	0.00	20.95	0.00	16.46	0.00	23.08	
3	FREQUENCY	17	1	0	1	0	38	2	29	1	2	101
	CELL CHI2	0.5	0.3	0.2	1.0	0.2	0.1	0.4	0.0	0.0	0.1	
	PERCENT	3.16	0.19	0.00	0.19	0.00	7.06	0.37	5.39	0.19	0.37	18.77
	ROW PCT	16.83	0.99	0.00	0.99	0.00	37.62	1.98	28.71	0.99	1.98	
	COL PCT	22.37	33.33	0.00	50.00	0.00	18.10	28.57	18.35	16.67	15.38	
4	FREQUENCY	17	0	0	1	0	41	5	37	3	3	126
	CELL CHI2	0.0	0.7	0.2	0.6	0.2	1.4	6.9	0.0	1.8	0.0	
	PERCENT	3.16	0.00	0.00	0.19	0.00	7.62	0.93	6.88	0.56	0.56	23.42
	ROW PCT	13.49	0.00	0.00	0.79	0.00	32.54	3.97	29.37	2.38	2.38	
	COL PCT	22.37	0.00	0.00	50.00	0.00	19.52	71.43	23.42	50.00	23.08	
5	FREQUENCY	17	0	0	0	1	46	0	36	1	2	109
	CELL CHI2	0.2	0.6	0.2	0.4	3.1	0.3	1.4	0.5	0.0	0.2	
	PERCENT	3.16	0.00	0.00	0.00	0.19	8.55	0.00	6.69	0.19	0.37	20.26
	ROW PCT	15.60	0.00	0.00	0.00	0.92	42.20	0.00	33.03	0.92	1.83	
	COL PCT	22.37	0.00	0.00	0.00	100.00	21.90	0.00	22.78	16.67	15.38	
TOTAL		76	3	1	2	1	210	7	158	6	13	538
		14.13	0.56	0.19	0.37	0.19	39.03	1.30	29.37	1.12	2.42	100.00

(CONTINUED)

1

H50

H50

YR=77   SEASON=SPRING   ZONE=2

TABLE OF FERT BY INV

FERT / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	15	16	17	19	22	23	24	25	26	TOTAL
1	1 1.1 0.19 1.00 50.00	0 0.6 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	0 2.6 0.00 0.00 0.00	1 0.4 0.19 1.00 33.33	0 0.6 0.00 0.00 0.00	4 1.0 0.74 4.00 30.77	5 0.3 0.93 5.00 23.81	0 0.2 0.00 0.00 0.00	100 18.59
2	1 1.0 0.19 0.98 50.00	1 0.3 0.19 0.98 33.33	0 0.2 0.00 0.00 0.00	6 4.2 1.12 5.88 42.86	1 0.3 0.19 0.98 33.33	0 0.6 0.00 0.00 0.00	3 0.1 0.56 2.94 23.08	3 0.2 0.56 2.94 14.29	0 0.2 0.00 0.00 0.00	102 18.96
3	0 0.4 0.00 0.00 0.00	0 0.6 0.00 0.00 0.00	1 3.5 0.19 0.99 100.00	1 1.0 0.19 0.99 7.14	0 0.6 0.00 0.00 0.00	0 0.6 0.00 0.00 0.00	3 0.1 0.56 2.97 23.08	5 0.3 0.93 4.95 23.81	0 0.2 0.00 0.00 0.00	101 18.77
4	0 0.5 0.00 0.00 0.00	2 2.4 0.37 1.59 66.67	0 0.2 0.00 0.00 0.00	7 4.2 1.30 5.56 50.00	1 0.1 0.19 0.79 33.33	2 2.4 0.37 1.59 66.67	2 0.4 0.37 1.59 15.38	4 0.2 0.74 3.17 19.05	1 2.5 0.19 0.79 100.00	126 23.42
5	0 0.4 0.00 0.00 0.00	0 0.6 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	0 2.8 0.00 0.00 0.00	0 0.6 0.00 0.00 0.00	1 0.3 0.19 0.92 33.33	1 1.0 0.19 0.92 7.69	4 0.0 0.74 3.67 19.05	0 0.2 0.00 0.00 0.00	109 20.26
TOTAL	2 0.37	3 0.56	1 0.19	14 2.60	3 0.56	3 0.56	13 2.42	21 3.90	1 0.19	538 100.00

1

YR=77   SEASON=SPRING   ZONE=2

TABLE OF PROP BY INV

PROP / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	1	2	3	5	6	7	9	13	14	TOTAL
1	47 3.2 8.74 18.29 61.84	3 1.7 0.56 1.17 100.00	0 0.5 0.00 0.00 0.00	1 0.0 0.19 0.39 50.00	0 0.5 0.00 0.00 0.00	102 0.0 18.96 39.69 48.57	2 0.5 0.37 0.78 28.57	70 0.4 13.01 27.24 44.30	5 1.6 0.93 1.95 83.33	6 0.0 1.12 2.33 46.15	257 47.77
2	29 2.9 5.39 10.32 38.16	0 1.6 0.00 0.00 0.00	1 0.4 0.19 0.36 100.00	1 0.0 0.19 0.36 50.00	1 0.4 0.19 0.36 100.00	108 0.0 20.07 38.43 51.43	5 0.5 0.93 1.78 71.43	88 0.4 16.36 31.32 55.70	1 1.5 0.19 0.36 16.67	7 0.0 1.30 2.49 53.85	281 52.23
TOTAL	76 14.13	3 0.56	1 0.19	2 0.37	1 0.19	210 39.03	7 1.30	158 29.37	6 1.12	13 2.42	538 100.00

(CONTINUED)

TABLE OF PROP BY INV

PROP / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	15	16	17	19	22	23	24	25	26	TOTAL
1	2 1.1 0.37 0.78 100.00	0 1.4 0.00 0.00 0.00	1 0.6 0.19 0.39 100.00	2 3.3 0.37 0.78 14.29	2 0.2 0.37 0.78 66.67	0 1.4 0.00 0.00 0.00	4 0.8 0.74 1.56 30.77	10 0.0 1.86 3.89 47.62	0 0.5 0.00 0.00 0.00	257 47.77
2	0 1.0 0.00 0.00 0.00	3 1.3 0.56 1.07 100.00	0 0.5 0.00 0.00 0.00	12 3.0 2.23 4.27 85.71	1 0.2 0.19 0.36 33.33	3 1.3 0.56 1.07 100.00	9 0.7 1.67 3.20 69.23	11 0.0 2.04 3.91 52.38	1 0.4 0.19 0.36 100.00	281 52.23
TOTAL	2 0.37	3 0.56	1 0.19	14 2.60	3 0.56	3 0.56	13 2.42	21 3.90	1 0.19	538 100.00

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H52

STATISTICAL ANALYSIS SYSTEM 1:09 THURSDAY, DECEMBER 22, 1977 30

YR=77 SEASON=SPRING ZONE=3

TABLE OF SPECIES BY INV

SPECIES / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	1	2	3	6	7	8	9	10	13	TOTAL
1	3 0.7 0.26 2.07 7.69	5 0.6 0.43 3.45 8.77	2 4.0 0.17 1.38 3.33	24 0.3 2.05 16.55 13.87	11 0.9 0.94 7.59 16.42	2 1.5 0.17 1.38 28.57	16 16.3 1.37 11.03 32.65	28 0.8 2.39 19.31 10.41	6 5.0 0.51 4.14 30.00	14 0.4 1.20 9.66 14.74	145 12.38
2	3 0.7 0.26 2.07 7.69	13 5.0 1.11 8.97 22.81	9 0.3 0.77 6.21 15.00	5 12.6 0.43 3.45 2.89	4 2.2 0.34 2.76 5.97	1 0.0 0.09 0.69 14.29	5 0.2 0.43 3.45 10.20	41 1.8 3.50 28.28 15.24	4 0.9 0.34 2.76 20.00	8 1.2 0.68 5.52 8.42	145 12.38
3	3 1.4 0.26 1.70 7.69	3 3.6 0.26 1.70 5.26	14 2.8 1.20 7.95 23.33	36 3.8 3.07 20.45 20.81	7 0.9 0.60 3.98 10.45	1 0.0 0.09 0.57 14.29	10 0.9 0.85 5.68 20.41	35 0.7 2.99 19.89 13.01	1 1.3 0.09 0.57 5.00	13 0.1 1.11 7.39 13.68	176 15.03
4	3 0.9 0.26 1.92 7.69	6 0.3 0.51 3.85 10.53	9 0.1 0.77 5.77 15.00	28 1.1 2.39 17.95 16.18	11 0.5 0.94 7.05 16.42	0 0.9 0.00 0.00 0.00	6 0.0 0.51 3.85 12.24	36 0.0 3.07 23.08 13.38	3 0.0 0.26 1.92 15.00	14 0.1 1.20 8.97 14.74	156 13.32
5	10 7.3 0.85 7.63 25.64	6 0.0 0.51 4.58 10.53	3 2.1 0.26 2.29 5.00	23 0.7 1.96 17.56 13.29	1 5.6 0.09 0.76 1.49	0 0.8 0.00 0.00 0.00	4 0.4 0.34 3.05 8.16	25 0.9 2.13 19.08 9.29	1 0.7 0.09 0.76 5.00	12 0.2 1.02 9.16 12.63	131 11.19
6	5 0.0 0.43 3.47 12.82	13 5.1 1.11 9.03 22.81	8 0.1 0.68 5.56 13.33	20 0.1 1.71 13.89 11.56	9 0.1 0.77 6.25 13.43	2 1.5 0.17 1.39 28.57	2 2.7 0.17 1.39 4.08	37 0.5 3.16 25.69 13.75	1 0.4 0.09 0.69 5.00	12 0.0 1.02 8.33 12.63	144 12.30
7	11 12.5 0.94 9.24 28.21	6 0.0 0.51 5.04 10.53	9 1.4 0.77 7.56 15.00	6 7.6 0.51 5.04 3.47	14 7.6 1.20 11.76 20.90	1 0.1 0.09 0.84 14.29	1 3.2 0.09 0.84 2.04	31 0.5 2.65 26.05 11.52	3 0.5 0.26 2.52 15.00	6 1.4 0.51 5.04 6.32	119 10.16
8	1 3.4 0.09 0.65 2.56	5 0.9 0.43 3.23 8.77	6 0.5 0.51 3.87 10.00	31 2.9 2.65 20.00 17.92	10 0.1 0.85 6.45 14.93	0 0.9 0.00 0.00 0.00	5 0.3 0.43 3.23 10.20	36 0.0 3.07 23.23 13.38	1 1.0 0.09 0.65 5.00	16 0.9 1.37 10.32 16.84	155 13.24
TOTAL	39 3.33	57 4.87	60 5.12	173 14.77	67 5.72	7 0.60	49 4.18	269 22.97	20 1.71	95 8.11	1171 100.00

(CONTINUED)

YR=77 SEASON=SPRING ZONE=3

TABLE OF SPECIES BY INV

SPECIES	INV	14	15	16	18	19	20	24	25	26	27	TOTAL
1	FREQUENCY	6	3	1	0	6	0	4	14	0	2	145
	CELL CHI2	1.0	0.2	6.2	0.2	0.1	0.1	2.2	0.2	2.0	2.1	12.38
	PERCENT	0.34	0.26	0.09	0.00	0.51	0.00	0.34	1.20	0.00	0.17	
	ROW PCT	2.76	2.07	0.69	0.00	4.14	0.00	2.76	9.66	0.00	1.38	
	COL PCT	7.55	9.38	100.00	0.00	10.71	0.00	5.97	13.86	0.00	33.33	
2	FREQUENCY	7	9	0	1	3	0	12	15	2	3	145
	CELL CHI2	0.0	6.4	0.1	2.3	2.2	0.1	1.7	0.5	0.0	6.9	12.38
	PERCENT	0.60	0.77	0.00	0.09	0.26	0.00	1.02	1.28	0.17	0.26	
	ROW PCT	4.83	6.21	0.00	0.69	2.07	0.00	8.28	10.34	1.38	2.07	
	COL PCT	13.21	28.13	0.00	50.00	5.36	0.00	17.91	14.85	12.50	50.00	
3	FREQUENCY	7	3	0	0	9	0	13	18	3	0	176
	CELL CHI2	0.1	0.7	0.2	0.3	0.0	0.2	0.9	0.5	0.1	0.9	15.03
	PERCENT	0.60	0.26	0.00	0.00	0.77	0.00	1.11	1.54	0.26	0.00	
	ROW PCT	3.98	1.70	0.00	0.00	5.11	0.00	7.39	10.23	1.70	0.00	
	COL PCT	13.21	9.38	0.00	0.00	16.07	0.00	19.40	17.82	18.75	0.00	
4	FREQUENCY	5	3	0	0	8	0	8	15	1	0	156
	CELL CHI2	0.6	0.4	0.1	0.3	0.0	0.1	0.1	0.2	0.6	0.8	13.32
	PERCENT	0.43	0.26	0.00	0.00	0.68	0.00	0.68	1.28	0.09	0.00	
	ROW PCT	3.21	1.92	0.00	0.00	5.13	0.00	5.13	9.62	0.64	0.00	
	COL PCT	9.43	9.38	0.00	0.00	14.29	0.00	11.94	14.85	6.25	0.00	
5	FREQUENCY	9	4	0	0	7	0	9	11	5	1	131
	CELL CHI2	1.6	0.0	0.1	0.2	0.1	0.1	0.3	0.0	5.8	0.2	11.19
	PERCENT	0.77	0.34	0.00	0.00	0.60	0.00	0.77	0.94	0.43	0.09	
	ROW PCT	6.87	3.05	0.00	0.00	5.34	0.00	6.87	8.40	3.82	0.76	
	COL PCT	16.98	12.50	0.00	0.00	12.50	0.00	13.43	10.89	31.25	16.67	
6	FREQUENCY	6	4	0	0	12	0	6	6	1	0	144
	CELL CHI2	0.0	0.0	0.1	0.2	3.8	0.1	0.6	3.3	0.5	0.7	12.30
	PERCENT	0.51	0.34	0.00	0.00	1.02	0.00	0.51	0.51	0.09	0.00	
	ROW PCT	4.17	2.78	0.00	0.00	8.33	0.00	4.17	4.17	0.69	0.00	
	COL PCT	11.32	12.50	0.00	0.00	21.43	0.00	8.96	5.94	6.25	0.00	
7	FREQUENCY	6	3	0	0	4	0	6	12	0	0	119
	CELL CHI2	0.1	0.0	0.1	0.2	0.5	0.1	0.1	0.3	1.6	0.6	10.16
	PERCENT	0.51	0.26	0.00	0.00	0.34	0.00	0.51	1.02	0.00	0.00	
	ROW PCT	5.04	2.52	0.00	0.00	3.36	0.00	5.04	10.08	0.00	0.00	
	COL PCT	11.32	9.38	0.00	0.00	7.14	0.00	8.96	11.88	0.00	0.00	
8	FREQUENCY	9	3	0	1	7	1	9	10	4	0	155
	CELL CHI2	0.6	0.4	0.1	2.0	0.0	5.7	0.0	0.8	1.7	0.8	13.24
	PERCENT	0.77	0.26	0.00	0.09	0.60	0.09	0.77	0.85	0.34	0.00	
	ROW PCT	5.81	1.94	0.00	0.65	4.52	0.65	5.81	6.45	2.58	0.00	
	COL PCT	16.98	9.38	0.00	50.00	12.50	100.00	13.43	9.90	25.00	0.00	
TOTAL		53	32	1	2	56	1	67	101	16	6	1171
		4.53	2.73	0.09	0.17	4.78	0.09	5.72	8.63	1.37	0.51	100.00

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1154

YR=77 SEASON=SPRING ZONE=3

TABLE OF FERT BY INV

FERT / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	1	2	3	6	7	8	9	10	13	TOTAL
1	8	9	7	40	12	1	11	51	5	18	238
	0.0	0.6	2.2	0.7	0.2	0.1	0.1	0.2	0.2	0.1	
	0.68	0.77	0.60	3.42	1.02	0.09	0.94	4.36	0.43	1.54	20.32
	3.36	3.78	2.94	16.81	5.04	0.42	4.62	21.43	2.10	7.56	
	20.51	15.79	11.67	23.12	17.91	14.29	22.45	18.96	25.00	18.95	
2	6	12	11	32	17	1	10	49	2	21	226
	0.3	0.1	0.0	0.1	1.3	0.1	0.0	0.2	0.9	0.4	
	0.51	1.02	0.94	2.73	1.45	0.09	0.85	4.18	0.17	1.79	19.30
	2.65	5.31	4.87	14.16	7.52	0.44	4.42	21.68	0.88	9.29	
	15.38	21.05	18.33	18.50	25.37	14.29	20.41	18.22	10.00	22.11	
3	5	9	12	30	9	2	12	58	2	22	224
	0.8	0.3	0.0	0.3	1.1	0.3	0.7	0.8	0.9	0.8	
	0.43	0.77	1.02	2.56	0.77	0.17	1.02	4.95	0.17	1.88	19.13
	2.23	4.02	5.36	13.39	4.02	0.89	5.36	25.89	0.89	9.82	
	12.82	15.79	20.00	17.34	13.43	28.57	24.49	21.56	10.00	23.16	
4	11	10	14	26	14	1	10	54	3	20	230
	1.5	0.1	0.4	1.9	0.1	0.1	0.0	0.0	0.2	0.1	
	0.94	0.85	1.20	2.22	1.20	0.09	0.85	4.61	0.26	1.71	19.64
	4.78	4.35	6.09	11.30	6.09	0.43	4.35	23.48	1.30	8.70	
	28.21	17.54	23.33	15.03	20.90	14.29	20.41	20.07	15.00	21.05	
5	9	17	16	45	15	2	6	57	8	14	253
	0.0	1.8	0.7	1.6	0.0	0.2	2.0	0.0	3.1	2.1	
	0.77	1.45	1.37	3.84	1.28	0.17	0.51	4.87	0.68	1.20	21.61
	3.56	6.72	6.32	17.79	5.93	0.79	2.37	22.53	3.16	5.53	
	23.08	29.82	26.67	26.01	22.39	28.57	12.24	21.19	40.00	14.74	
TOTAL	39	57	60	173	67	7	49	269	20	95	1171
	3.33	4.87	5.12	14.77	5.72	0.60	4.18	22.97	1.71	8.11	100.00

(CONTINUED)

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H55

H55

YR=77 SEASON=SPRING ZONE=3

TABLE OF FERT BY INV

FERT / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	14	15	16	18	19	20	24	25	26	27	TOTAL
1	12 0.1 1.02 5.04 22.64	5 0.3 0.43 2.10 15.63	0 0.2 0.00 0.00 0.00	1 0.9 0.09 0.42 50.00	16 1.9 1.37 6.72 28.57	1 3.1 0.09 0.42 100.00	16 0.4 1.37 6.72 23.88	19 0.1 1.62 7.98 18.81	3 0.0 0.26 1.26 18.75	3 2.6 0.26 1.26 50.00	238 20.32
2	10 0.0 0.85 4.42 18.87	9 1.3 0.77 3.98 28.13	0 0.2 0.00 0.00 0.00	0 0.4 0.00 0.00 0.00	8 0.7 0.68 3.54 14.29	0 0.2 0.00 0.00 0.00	12 0.1 1.02 5.31 17.91	21 0.1 1.79 9.29 20.79	4 0.3 0.34 1.77 25.00	1 0.0 0.09 0.44 16.67	226 19.30
3	7 1.0 0.60 3.13 13.21	6 0.0 0.51 2.68 18.75	1 3.4 0.09 0.45 100.00	0 0.4 0.00 0.00 0.00	12 0.2 1.02 5.36 21.43	0 0.2 0.00 0.00 0.00	15 0.4 1.28 6.70 22.39	18 0.1 1.54 8.04 17.82	4 0.3 0.34 1.79 25.00	0 1.1 0.00 0.00 0.00	224 19.13
4	13 0.6 1.11 5.65 24.53	3 1.7 0.26 1.30 9.38	0 0.2 0.00 0.00 0.00	0 0.4 0.00 0.00 0.00	9 0.4 0.77 3.91 16.07	0 0.2 0.00 0.00 0.00	14 0.1 1.20 6.09 20.90	23 0.5 1.96 10.00 22.77	4 0.2 0.34 1.74 25.00	1 0.0 0.09 0.43 16.67	230 19.64
5	11 0.0 0.94 4.35 20.75	9 0.6 0.77 3.56 28.13	0 0.2 0.00 0.00 0.00	1 0.7 0.09 0.40 50.00	11 0.1 0.94 4.35 19.64	0 0.2 0.00 0.00 0.00	10 1.4 0.85 3.95 14.93	20 0.2 1.71 7.91 19.80	1 1.7 0.09 0.40 6.25	1 0.1 0.09 0.40 16.67	253 21.61
TOTAL	53 4.53	32 2.73	1 0.09	2 0.17	56 4.78	1 0.09	67 5.72	101 8.63	16 1.37	6 0.51	1171 100.00

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YR=77 SEASON=SPRING ZONE=3

TABLE OF PROP BY INV

PROP / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	1	2	3	6	7	8	9	10	13	TOTAL
1	25 2.5 2.13 4.55 64.10	34 2.0 2.90 6.19 59.65	21 1.8 1.79 3.83 35.00	69 1.8 5.89 12.57 39.88	26 0.9 2.22 4.74 38.81	3 0.0 0.26 0.55 42.86	31 2.8 2.65 5.65 63.27	121 0.2 10.33 22.04 44.98	14 2.3 1.20 2.55 70.00	43 0.1 3.67 7.83 45.26	549 46.88
2	14 2.2 1.20 2.25 35.90	23 1.7 1.96 3.70 40.35	39 1.6 3.33 6.27 65.00	104 1.6 8.88 16.72 60.12	41 0.8 3.50 6.59 61.19	4 0.0 0.34 0.64 57.14	18 2.5 1.54 2.89 36.73	148 0.2 12.64 23.79 55.02	6 2.0 0.51 0.96 30.00	52 0.0 4.44 8.36 54.74	622 53.12
TOTAL	39 3.33	57 4.87	60 5.12	173 14.77	67 5.72	7 0.60	49 4.18	269 22.97	20 1.71	95 8.11	1171 100.00

(CONTINUED)

TABLE OF PROP BY INV

PROP / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	14	15	16	18	19	20	24	25	26	27	TOTAL
1	22 0.3 1.88 4.01 41.51	17 0.3 1.45 3.10 53.13	1 0.6 0.09 0.18 100.00	2 1.2 0.17 0.36 100.00	34 2.3 2.90 6.19 60.71	0 0.5 0.00 0.00 0.00	35 0.4 2.99 6.38 52.24	40 1.1 3.42 7.29 39.60	7 0.0 0.60 1.28 43.75	4 0.5 0.34 0.73 66.67	549 46.88
2	31 0.3 2.65 4.98 58.49	15 0.2 1.28 2.41 46.88	0 0.5 0.00 0.00 0.00	0 1.1 0.00 0.00 0.00	22 2.0 1.88 3.54 39.29	1 0.4 0.09 0.16 100.00	32 0.4 2.73 5.14 47.76	61 1.0 5.21 9.81 60.40	9 0.0 0.77 1.45 56.25	2 0.4 0.17 0.32 33.33	622 53.12
TOTAL	53 4.53	32 2.73	1 0.09	2 0.17	56 4.78	1 0.09	67 5.72	101 8.63	16 1.37	6 0.51	1171 100.00

1

YR=77 SEASON=FALL

TABLE OF ZONE BY INV

ZONE / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	1	2	3	6	7	8	9	10	TOTAL
1	1 3.9 0.31 50.00 3.57	0 0.0 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	1 3.2 0.31 50.00 3.13	0 0.1 0.00 0.00 0.00	0 0.0 0.00 0.00 0.00	0 0.4 0.00 0.00 0.00	0 0.3 0.00 0.00 0.00	2 0.63
2	22 19.8 6.92 22.00 78.57	1 0.1 0.31 1.00 25.00	0 2.5 0.00 0.00 0.00	0 9.1 0.00 0.00 0.00	30 39.5 9.43 30.00 93.75	6 4.8 1.89 6.00 75.00	0 1.9 0.00 0.00 0.00	21 0.1 6.60 21.00 29.58	0 0.9 0.00 0.00 0.00	100 31.45
3	5 10.3 1.57 2.31 17.86	3 0.0 0.94 1.39 75.00	8 1.2 2.52 3.70 100.00	29 4.4 9.12 13.43 100.00	1 19.8 0.31 0.46 3.13	2 2.2 0.63 0.93 25.00	6 0.9 1.89 2.78 100.00	50 0.1 15.72 23.15 70.42	3 0.5 0.94 1.39 100.00	216 67.92
TOTAL	28 8.81	4 1.26	8 2.52	29 9.12	32 10.06	8 2.52	6 1.89	71 22.33	3 0.94	318 100.00

(CONTINUED)

YR=77 SEASON=FALL

TABLE OF ZONE BY INV

ZONE FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	INV 11	14	15	18	19	20	24	25	26	TOTAL
1	0 0.0 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	0 0.0 0.00 0.00 0.00	0 0.0 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 0.0 0.00 0.00 0.00	0 0.0 0.00 0.00 0.00	0 0.3 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	2 0.63
2	0 1.6 0.00 0.00 0.00	9 0.6 2.83 9.00 24.32	0 0.3 0.00 0.00 0.00	3 4.5 0.94 3.00 100.00	5 0.7 1.57 5.00 45.45	0 0.3 0.00 0.00 0.00	0 1.9 0.00 0.00 0.00	3 11.8 0.94 3.00 5.45	0 3.1 0.00 0.00 0.00	100 31.45
3	5 0.8 1.57 2.31 100.00	28 0.3 8.81 12.96 75.68	1 0.2 0.31 0.46 100.00	0 2.0 0.00 0.00 0.00	6 0.3 1.89 2.78 54.55	1 0.2 0.31 0.46 100.00	6 0.9 1.89 2.78 100.00	52 5.7 16.35 24.07 94.55	10 1.5 3.14 4.63 100.00	216 67.92
TOTAL	5 1.57	37 11.64	1 0.31	3 0.94	11 3.46	1 0.31	6 1.89	55 17.30	10 3.14	318 100.00

YR=77 SEASON=FALL ZONE=1

TABLE OF FERT BY INV

FERT / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	6	TOTAL
3	1 0.0 50.00 50.00 100.00	1 0.0 50.00 50.00 100.00	2 100.00
TOTAL	1 50.00	1 50.00	2 100.00

YR=77   SEASON=FALL   ZONE=2

TABLE OF SPECIES BY INV

SPECIES / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	1	6	7	9	14	18	19	25	TOTAL
8	22 0.0 22.00 22.00 100.00	1 0.0 1.00 1.00 100.00	30 0.0 30.00 30.00 100.00	6 0.0 6.00 6.00 100.00	21 0.0 21.00 21.00 100.00	9 0.0 9.00 9.00 100.00	3 0.0 3.00 3.00 100.00	5 0.0 5.00 5.00 100.00	3 0.0 3.00 3.00 100.00	100 100.00
TOTAL	22 22.00	1 1.00	30 30.00	6 6.00	21 21.00	9 9.00	3 3.00	5 5.00	3 3.00	100 100.00

YR=77 SEASON=FALL ZONE=2

TABLE OF FERT BY INV

FERT / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	1	6	7	9	14	18	19	25	TOTAL
1	7 1.5 7.00 35.00 31.82	0 0.2 0.00 0.00 0.00	5 0.2 5.00 25.00 16.67	1 0.0 1.00 5.00 16.67	3 0.3 3.00 15.00 14.29	3 0.8 3.00 15.00 33.33	0 0.6 0.00 0.00 0.00	0 1.0 0.00 0.00 0.00	1 0.3 1.00 5.00 33.33	20 20.00
2	4 0.0 4.00 22.22 18.18	1 3.7 1.00 5.56 100.00	5 0.0 5.00 27.78 16.67	2 0.8 2.00 11.11 33.33	3 0.2 3.00 16.67 14.29	2 0.1 2.00 11.11 22.22	0 0.5 0.00 0.00 0.00	0 0.9 0.00 0.00 0.00	1 0.4 1.00 5.56 33.33	18 18.00
3	3 0.1 3.00 18.75 13.64	0 0.2 0.00 0.00 0.00	6 0.3 6.00 37.50 20.00	1 0.0 1.00 6.25 16.67	4 0.1 4.00 25.00 19.05	1 0.1 1.00 6.25 11.11	0 0.5 0.00 0.00 0.00	0 0.8 0.00 0.00 0.00	1 0.6 1.00 6.25 33.33	16 16.00
4	3 1.3 3.00 11.54 13.64	0 0.3 0.00 0.00 0.00	7 0.1 7.00 26.92 23.33	1 0.2 1.00 3.85 16.67	6 0.1 6.00 23.08 28.57	1 0.8 1.00 3.85 11.11	3 6.3 3.00 11.54 100.00	5 10.5 5.00 19.23 100.00	0 0.8 0.00 0.00 0.00	26 26.00
5	5 0.1 5.00 25.00 22.73	0 0.2 0.00 0.00 0.00	7 0.2 7.00 35.00 23.33	1 0.0 1.00 5.00 16.67	5 0.2 5.00 25.00 23.81	2 0.0 2.00 10.00 22.22	0 0.6 0.00 0.00 0.00	0 1.0 0.00 0.00 0.00	0 0.6 0.00 0.00 0.00	20 20.00
TOTAL	22 22.00	1 1.00	30 30.00	6 6.00	21 21.00	9 9.00	3 3.00	5 5.00	3 3.00	100 100.00

1162

YR=77 SEASON=FALL ZONE=3

TABLE OF SPECIES BY INV

SPECIES / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	1	2	3	6	7	8	9	10	TOTAL
8	5 0.0 2.31 2.31 100.00	3 0.0 1.39 1.39 100.00	8 0.0 3.70 3.70 100.00	29 0.0 13.43 13.43 100.00	1 0.0 0.46 0.46 100.00	2 0.0 0.93 0.93 100.00	6 0.0 2.78 2.78 100.00	50 0.0 23.15 23.15 100.00	3 0.0 1.39 1.39 100.00	216 100.00
TOTAL	5 2.31	3 1.39	8 3.70	29 13.43	1 0.46	2 0.93	6 2.78	50 23.15	3 1.39	216 100.00

(CONTINUED)

TABLE OF SPECIES BY INV

SPECIES / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	11	14	15	19	20	24	25	26	TOTAL
8	5 0.0 2.31 2.31 100.00	28 0.0 12.96 12.96 100.00	1 0.0 0.46 0.46 100.00	6 0.0 2.78 2.78 100.00	1 0.0 0.46 0.46 100.00	6 0.0 2.78 2.78 100.00	52 0.0 24.07 24.07 100.00	10 0.0 4.63 4.63 100.00	216 100.00
TOTAL	5 2.31	28 12.96	1 0.46	6 2.78	1 0.46	6 2.78	52 24.07	10 4.63	216 100.00

YR=77 SEASON=FALL ZONE=3

TABLE OF FERT BY INV

FERT / FREQUENCY, CELL CHI2, PERCENT, ROW PCT, COL PCT	INV 0	1	2	3	6	7	8	9	10	TOTAL
1	0	0	3	4	0	0	0	12	1	51
	1.2	0.7	0.7	1.2	0.2	0.5	1.4	0.0	0.1	
	0.00	0.00	1.39	1.85	0.00	0.00	0.00	5.56	0.46	23.61
	0.00	0.00	5.88	7.84	0.00	0.00	0.00	23.53	1.96	
	0.00	0.00	37.50	13.79	0.00	0.00	0.00	24.00	33.33	
2	2	C	2	9	0	1	2	11	1	51
	0.6	0.7	0.0	0.7	0.2	0.6	0.2	0.1	0.1	
	0.93	0.00	0.93	4.17	0.00	0.46	0.93	5.09	0.46	23.61
	3.92	0.00	3.92	17.65	0.00	1.96	3.92	21.57	1.96	
	40.00	0.00	25.00	31.03	0.00	50.00	33.33	22.00	33.33	
3	0	2	1	7	0	0	4	10	0	41
	0.9	3.6	0.2	0.4	0.2	0.4	7.2	0.0	0.6	
	0.00	0.93	0.46	3.24	0.00	0.00	1.85	4.63	0.00	18.98
	0.00	4.88	2.44	17.07	0.00	0.00	9.76	24.39	0.00	
	0.00	66.67	12.50	24.14	0.00	0.00	66.67	20.00	0.00	
4	1	1	0	3	0	0	0	10	1	37
	0.0	0.5	1.4	0.8	0.2	0.3	1.0	0.2	0.5	
	0.46	0.46	0.00	1.39	0.00	0.00	0.00	4.63	0.46	17.13
	2.70	2.70	0.30	8.11	0.30	0.00	0.30	27.03	2.70	
	20.00	33.33	C.00	10.34	3.00	0.00	0.00	20.00	33.33	
5	2	0	2	6	1	1	0	7	0	36
	1.6	0.5	0.3	0.3	4.2	1.3	1.0	0.2	0.5	
	0.93	0.00	0.93	2.78	0.46	0.46	0.00	3.24	0.00	16.67
	5.56	0.00	5.56	16.67	2.78	2.78	0.00	19.44	0.00	
	40.00	0.00	25.00	20.69	100.00	50.00	0.00	14.00	0.00	
TOTAL	5	3	8	29	1	2	6	50	3	216
	2.31	1.39	3.70	13.43	0.46	0.93	2.78	23.15	1.39	100.00

(CONTINUED)

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M

YR=77 SEASON=FALL ZONE=3 22:28 WEDNESDAY, DECEMBER 21, 1977

TABLE OF FERT BY INV

FERT / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	11	14	15	19	20	24	25	26	TOTAL
1	1 0.0 0.46 1.96 20.00	5 0.4 2.31 9.80 17.86	1 2.5 C.46 1.96 100.00	2 0.2 0.93 3.92 33.33	1 2.5 0.46 1.96 100.00	2 0.2 0.93 3.92 33.33	15 0.6 6.94 29.41 28.85	4 1.1 1.85 7.84 40.00	51 23.61
2	1 0.0 0.46 1.96 20.00	7 0.0 3.24 13.73 25.00	0 0.2 0.00 0.00 0.00	1 0.1 0.46 1.96 16.67	0 0.2 0.00 0.00 0.00	0 1.4 0.00 0.00 0.00	12 0.0 5.56 23.53 23.08	2 0.1 0.93 3.92 20.00	51 23.61
3	2 1.2 0.93 4.88 40.00	3 1.0 1.39 7.32 10.71	0 0.2 0.00 C.00 C.00	0 1.1 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	1 0.0 0.46 2.44 16.67	9 0.1 4.17 21.95 17.31	2 0.0 0.93 4.88 20.00	41 18.98
4	1 0.0 0.46 2.70 20.00	7 1.0 3.24 18.92 25.00	0 0.2 0.00 0.00 0.00	0 1.0 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	3 3.8 1.39 8.11 50.00	9 0.0 4.17 24.32 17.31	1 0.3 0.46 2.70 10.00	37 17.13
5	0 0.8 0.00 0.00 0.00	6 0.4 2.78 16.67 21.43	0 0.2 0.00 0.00 C.00	3 4.0 1.39 8.33 50.00	0 0.2 0.00 0.00 0.00	0 1.0 0.00 0.00 0.00	7 0.3 3.24 19.44 13.46	1 0.3 0.46 2.78 10.00	36 16.67
TOTAL	5 2.31	28 12.96	1 C.46	6 2.78	1 0.46	6 2.78	52 24.07	10 4.63	216 100.00

H65

STATISTICAL ANALYSIS SYSTEM 1:09 T

STATISTICAL ANALYSIS SYSTEM 1:09 THUR

YR=77 SEASON=FALL ZONE=3

TABLE OF FERT BY INV

H66

FERT / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	1	2	3	6	7	8	9	10	11	14	15	19	20	24	25	26	TOTAL
1	0 1.2 0.00 0.00 0.00	0 0.7 0.00 0.00 0.00	3 0.7 1.39 5.88 37.50	4 1.2 1.85 7.84 13.79	0 0.2 0.00 0.00 0.00	0 0.5 0.00 0.00 0.00	0 1.4 0.00 0.00 0.00	12 0.0 5.56 23.53 24.00	1 0.1 0.46 1.96 33.33	1 0.0 0.46 1.96 20.00	5 0.4 2.31 9.80 17.86	1 2.5 0.46 1.96 100.00	2 0.2 0.93 3.92 33.33	1 2.5 0.46 1.96 100.00	2 0.2 0.93 3.92 33.33	15 0.6 6.94 29.41 28.85	4 1.1 1.85 7.84 40.00	51 23.61
2	2 0.6 0.93 3.92 40.00	0 0.7 0.00 0.00 0.00	2 0.0 0.93 3.92 25.00	9 0.7 4.17 17.65 31.03	0 0.2 0.00 0.00 0.00	1 0.6 0.46 1.96 50.00	2 0.2 0.93 3.92 33.33	11 0.1 5.09 21.57 22.00	1 0.1 0.46 1.96 33.33	1 0.0 0.46 1.96 20.00	7 0.0 3.24 13.73 25.00	0 0.2 0.00 0.00 0.00	1 0.1 0.46 1.96 16.67	0 0.2 0.00 0.00 0.00	0 1.4 0.00 0.00 0.00	12 0.0 5.56 23.53 23.08	2 0.1 0.93 3.92 20.00	51 23.61
3	0 0.9 0.00 0.00 0.00	2 3.6 0.93 4.88 66.67	1 0.2 0.46 2.44 12.50	7 0.4 3.24 17.07 24.14	0 0.2 0.00 0.00 0.00	0 0.4 0.00 0.00 0.00	4 7.2 1.85 9.76 66.67	10 0.0 4.63 24.39 20.00	0 0.6 0.00 0.00 0.00	2 1.2 0.93 4.88 40.00	3 1.0 1.39 7.32 10.71	0 0.2 0.00 0.00 0.00	0 1.1 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	1 0.0 0.46 2.44 16.67	9 0.1 4.17 21.95 17.31	2 0.0 0.93 4.88 20.00	41 18.98
4	1 0.0 0.46 2.70 20.00	1 0.5 0.46 2.70 33.33	0 1.4 0.00 0.00 0.00	3 0.8 1.39 8.11 10.34	0 0.2 0.00 0.00 0.00	0 0.3 0.00 0.00 0.00	0 1.0 0.00 0.00 0.00	10 0.2 4.63 27.03 20.00	1 0.5 0.46 2.70 33.33	1 0.0 0.46 2.70 20.00	7 1.0 3.24 18.92 25.00	0 0.2 0.00 0.00 0.00	0 1.0 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	3 3.8 1.39 8.11 50.00	9 0.0 4.17 24.32 17.31	1 0.3 0.46 2.70 10.00	37 17.13
5	2 1.6 0.93 5.56 40.00	0 0.5 0.00 0.00 0.00	2 0.3 0.93 5.56 25.00	6 0.3 2.78 16.67 20.69	1 4.2 0.46 2.78 100.00	1 1.3 0.46 2.78 50.00	0 1.0 0.00 0.00 0.00	7 0.2 3.24 19.44 14.00	0 0.5 0.00 0.00 0.00	0 0.8 0.00 0.00 0.00	6 0.4 2.78 16.67 21.43	0 0.2 0.00 0.00 0.00	3 4.0 1.39 8.33 50.00	0 0.2 0.00 0.00 0.00	0 1.0 0.00 0.00 0.00	7 0.3 3.24 19.44 13.46	1 0.3 0.46 2.78 10.00	36 16.67
TOTAL	5 2.31	3 1.39	8 3.70	29 13.43	1 0.46	2 0.93	6 2.78	50 23.15	3 1.39	5 2.31	28 12.96	1 0.46	6 2.78	1 0.46	6 2.78	52 24.07	10 4.63	216 100.00

YR=77 SEASON=FALL ZONE=3

TABLE OF SPECIES BY INV

SPECIES / INV (FREQUENCY, CELL CHI2, PERCENT, ROW PCT, COL PCT)	0	1	2	3	6	7	8	9	10	TOTAL
8	5 0.0 2.31 2.31 100.00	3 0.0 1.39 1.39 100.00	8 0.0 3.70 3.70 100.00	29 0.0 13.43 13.43 100.00	1 0.0 0.46 0.46 100.00	2 0.0 0.93 0.93 100.00	6 0.0 2.78 2.78 100.00	50 0.0 23.15 23.15 100.00	3 0.0 1.39 1.39 100.00	216 100.00
TOTAL	5 2.31	3 1.39	8 3.70	29 13.43	1 0.46	2 0.93	6 2.78	50 23.15	3 1.39	216 100.00

(CONTINUED)

TABLE OF SPECIES BY INV

SPECIES / INV (FREQUENCY, CELL CHI2, PERCENT, ROW PCT, COL PCT)	11	14	15	19	20	24	25	26	TOTAL
8	5 0.0 2.31 2.31 100.00	28 0.0 12.96 12.96 100.00	1 0.0 0.46 0.46 100.00	6 0.0 2.78 2.78 100.00	1 0.0 0.46 0.46 100.00	6 0.0 2.78 2.78 100.00	52 0.0 24.07 24.07 100.00	10 0.0 4.63 4.63 100.00	216 100.00
TOTAL	5 2.31	28 12.96	1 0.46	6 2.78	1 0.46	6 2.78	52 24.07	10 4.63	216 100.00

STATISTICAL ANALYSIS SYSTEM 1:09 THURSDAY, DECEMBER 22, 1977 7

YR=77 SEASON=FALL ZONE=2

TABLE OF FERT BY INV

FERT / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	1	6	7	9	14	18	19	25	TOTAL
1	7 1.5 7.00 35.00 31.82	0 0.2 0.00 0.00 0.00	5 0.2 5.00 25.00 16.67	1 0.0 1.00 5.00 16.67	3 0.3 3.00 15.00 14.29	3 0.8 3.00 15.00 33.33	0 0.6 0.00 0.00 0.00	0 1.0 0.00 0.00 0.00	1 0.3 1.00 5.00 33.33	20 20.00
2	4 0.0 4.00 22.22 18.18	1 3.7 1.00 5.56 100.00	5 0.0 5.00 27.78 16.67	2 0.8 2.00 11.11 33.33	3 0.2 3.00 16.67 14.29	2 0.1 2.00 11.11 22.22	0 0.5 0.00 0.00 0.00	0 0.9 0.00 0.00 0.00	1 0.4 1.00 5.56 33.33	18 18.00
3	3 0.1 3.00 18.75 13.64	0 0.2 0.00 0.00 0.00	6 0.3 6.00 37.50 20.00	1 0.0 1.00 6.25 16.67	4 0.1 4.00 25.00 19.05	1 0.1 1.00 6.25 11.11	0 0.5 0.00 0.00 0.00	0 0.8 0.00 0.00 0.00	1 0.6 1.00 6.25 33.33	16 16.00
4	3 1.3 3.00 11.54 13.64	0 0.3 0.00 0.00 0.00	7 0.1 7.00 26.92 23.33	1 0.3 1.00 3.85 16.67	6 0.1 6.00 23.08 28.57	1 0.8 1.00 3.85 11.11	3 6.3 3.00 11.54 100.00	5 10.5 5.00 19.23 100.00	0 0.8 0.00 0.00 0.00	26 26.00
5	5 0.1 5.00 25.00 22.73	0 0.2 0.00 0.00 0.00	7 0.2 7.00 35.00 23.33	1 0.0 1.00 5.00 16.67	5 0.2 5.00 25.00 23.81	2 0.0 2.00 10.00 22.22	0 0.6 0.00 0.00 0.00	0 1.0 0.00 0.00 0.00	0 0.6 0.00 0.00 0.00	20 20.00
TOTAL	22 22.00	1 1.00	30 30.00	6 6.00	21 21.00	9 9.00	3 3.00	5 5.00	3 3.00	100 100.00

YR=77   SEASON=FALL   ZONE=2

TABLE OF SPECIES BY INV

SPECIES / INV (FREQUENCY, CELL CHI2, PERCENT, ROW PCT, COL PCT)	0	1	6	7	9	14	18	19	25	TOTAL
8	22 0.0 22.00 22.00 100.00	1 0.0 1.00 1.00 100.00	30 0.0 30.00 30.00 100.00	6 0.0 6.00 6.00 100.00	21 0.0 21.00 21.00 100.00	9 0.0 9.00 9.00 100.00	3 0.0 3.00 3.00 100.00	5 0.0 5.00 5.00 100.00	3 0.0 3.00 3.00 100.00	100 100.00
TOTAL	22 22.00	1 1.00	30 30.00	6 6.00	21 21.00	9 9.00	3 3.00	5 5.00	3 3.00	100 100.00

1

H69

STATISTICAL ANALYSIS SYSTEM 1:09 THURSDAY, DECEMBER 22, 1977

YR=77 SEASON=FALL ZONE=1

TABLE OF FERT BY INV

FERT / INV (FREQUENCY, CELL CHI2, PERCENT, ROW PCT, COL PCT)	0	6	TOTAL
3	1 0.0 50.00 50.00 100.00	1 0.0 50.00 50.00 100.00	2 100.00
TOTAL	1 50.00	1 50.00	2 100.00

1

1170

YR=77 SEASON=FALL ZONE=1

TABLE OF SPECIES BY INV

SPECIES / INV (FREQUENCY, CELL CHI2, PERCENT, ROW PCT, COL PCT)	0	6	TOTAL
8	1 0.0 50.00 50.00 100.00	1 0.0 50.00 50.00 100.00	2 100.00
TOTAL	1 50.00	1 50.00	2 100.00

H71

PART 2

STATISTICAL ANALYSIS SYSTEM   22:28 WEDNESDAY, DECEMBER 21, 1977 1

TABLE OF ZONE BY INV

ZONE FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	INV 0	1	2	3	4	5	6	7	8	9	TOTAL
.	10	0	0	0	0	0	0	0	0	0	. .
1	110 118.9 2.76 94.02 7.96	1 4.4 0.03 0.85 0.47	0 2.8 0.00 0.00 0.00	0 8.6 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	6 7.2 0.15 5.13 1.03	0 0.9 0.00 0.00 0.00	0 2.8 0.00 0.00 0.00	0 15.0 0.00 0.00 0.00	117 2.93
2	431 0.1 10.81 35.15 31.19	22 28.9 0.55 1.79 10.33	5 20.7 0.13 0.41 5.15	2 86.4 0.05 0.16 0.68	0 2.2 0.00 0.00 0.00	3 0.1 0.08 0.24 37.50	448 404.4 11.24 36.54 76.98	15 3.1 0.38 1.22 48.39	0 29.8 0.00 0.00 0.00	186 5.4 4.67 15.17 36.47	1226 30.75
3	841 6.2 21.09 31.81 60.85	190 16.8 4.77 7.19 89.20	92 11.9 2.31 3.48 94.85	292 48.3 7.32 11.04 99.32	7 1.2 0.18 0.26 100.00	5 0.0 0.13 0.19 62.50	128 172.4 3.21 4.84 21.99	16 1.0 0.40 0.61 51.61	97 16.6 2.43 3.67 100.00	324 0.6 8.13 12.25 63.53	2644 66.32
TOTAL	1382 34.66	213 5.34	97 2.43	294 7.37	7 0.18	8 0.20	582 14.60	31 0.78	97 2.43	510 12.79	3987 100.00

(CONTINUED)

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   22:28 WEDNESDAY, DECEMBER 21, 1977   2

TABLE OF ZONE BY INV

ZONE / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	10	11	12	13	14	15	16	17	18	19	TOTAL
.	0	0	0	0	0	0	0	0	0	0	. .
1	0 0.9 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 3.6 0.00 0.00 0.00	0 3.4 0.00 0.00 0.00	0 1.1 0.00 0.00 0.00	0 0.4 0.00 0.00 0.00	0 0.0 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	0 3.2 0.00 0.00 0.00	117 2.93
2	0 8.9 0.00 0.00 0.00	0 1.5 0.00 0.00 0.00	0 0.9 0.00 0.00 0.00	6 26.5 0.15 0.49 4.92	23 4.3 0.58 1.88 20.00	2 7.7 0.05 0.16 5.41	7 3.0 0.18 0.57 58.33	1 1.6 0.03 0.08 100.00	4 1.0 0.10 0.33 50.00	27 1.3 0.68 2.20 24.77	1226 30.75
3	29 5.0 0.73 1.10 100.00	5 0.9 0.13 0.19 100.00	3 0.5 0.08 0.11 100.00	116 15.2 2.91 4.39 95.08	92 3.2 2.31 3.48 80.00	35 4.5 0.88 1.32 94.59	5 1.1 0.13 0.19 41.67	0 0.7 0.00 0.00 0.00	4 0.3 0.10 0.15 50.00	82 1.3 2.06 3.10 75.23	2644 66.32
TOTAL	29 0.73	5 0.13	3 0.08	122 3.06	115 2.88	37 0.93	12 0.30	1 0.03	8 0.20	109 2.73	3987 100.00

(CONTINUED)

STATISTICAL ANALYSIS SYSTEM 3

22:28 WEDNESDAY, DECEMBER 21, 1977

TABLE OF ZONE BY INV

ZONE / FREQUENCY / CELL CHI2 / PERCENT / ROW PCT / COL PCT	INV 20	21	22	23	24	25	26	27	TOTAL
.	0	0	0	0	0	0	0	0	.
	.	.	.	.	.	.	.	.	.
	.	.	.	.	.	.	.	.	
	.	.	.	.	.	.	.	.	
	.	.	.	.	.	.	.	.	
1	0	0	0	0	0	0	0	0	117
	0.1	0.0	0.1	0.1	3.0	5.2	0.8	0.2	2.93
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	0	0	3	3	13	24	1	0	1226
	1.5	0.3	4.7	2.5	10.8	17.0	6.4	1.8	30.75
	0.00	0.00	0.08	0.08	0.33	0.60	0.03	0.00	
	0.00	0.00	0.24	0.24	1.06	1.96	0.08	0.00	
	0.00	0.00	100.00	75.00	12.75	13.56	3.70	0.00	
3	5	1	0	1	89	153	26	6	2644
	0.9	0.2	2.0	1.0	6.7	10.8	3.7	1.0	66.32
	0.13	0.03	0.00	0.03	2.23	3.84	0.65	0.15	
	0.19	0.04	0.00	0.04	3.37	5.79	0.98	0.23	
	100.00	100.00	0.00	25.00	87.25	86.44	96.30	100.00	
TOTAL	5	1	3	4	102	177	27	6	3987
	0.13	0.03	0.08	0.10	2.56	4.44	0.68	0.15	100.00

ZONE=1

TABLE OF SPECIES BY INV

SPECIES FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	INV 0	1	6	TOTAL
1	2 0.0 1.71 100.00 1.82	0 0.0 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	2 1.71
2	6 0.1 5.13 85.71 5.45	0 0.1 0.00 0.00 0.00	1 1.1 0.85 14.29 16.67	7 5.98
4	22 0.0 18.80 95.65 20.00	0 0.2 0.00 0.00 0.00	1 0.0 0.85 4.35 16.67	23 19.66
5	60 0.2 51.28 100.00 54.55	0 0.5 0.00 0.00 0.00	0 3.1 0.00 0.00 0.00	60 51.28
TOTAL	110 94.02	1 0.85	6 5.13	117 100.00

(CONTINUED)

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   22:28 WEDNESDAY, DECEMBER 21, 1977   9

ZONE=1

TABLE OF SPECIES BY INV

SPECIES / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	1	6	TOTAL
6	8 0.0 6.84 88.89 7.27	0 0.1 0.00 0.00 0.00	1 0.6 0.85 11.11 16.67	9 7.69
7	10 0.1 8.55 83.33 9.09	1 7.9 0.85 8.33 100.00	1 0.2 0.85 8.33 16.67	12 10.26
8	2 0.8 1.71 50.00 1.82	0 0.0 0.00 0.00 0.00	2 15.7 1.71 50.00 33.33	4 3.42
TOTAL	110 94.02	1 0.85	6 5.13	117 100.00

ZONE=1

TABLE OF FERT BY INV

FERT / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	1	6	TOTAL
1	23 0.1 19.66 100.00 20.91	0 0.2 0.00 0.00 0.00	0 1.2 0.00 0.00 0.00	23 19.66
2	22 0.0 18.80 95.65 20.00	0 0.2 0.00 0.00 0.00	1 0.0 0.85 4.35 16.67	23 19.66
3	18 0.6 15.38 78.26 16.36	1 3.3 0.85 4.35 100.00	4 6.7 3.42 17.39 66.67	23 19.66
4	11 0.0 9.40 100.00 10.00	0 0.1 0.00 0.00 0.00	0 0.6 0.00 0.00 0.00	11 9.40
5	36 0.0 30.77 97.30 32.73	0 0.3 0.00 0.00 0.00	1 0.4 0.85 2.70 16.67	37 31.62
TOTAL	110 94.02	1 0.85	6 5.13	117 100.00

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ZONE=1

STATISTICS FOR 2-WAY TABLES

CHI-SQUARE	13.813	DF= 8	PROB=0.0868
PHI	0.344		
CONTINGENCY COEFFICIENT	0.325		
CRAMER'S V	0.243		

ZONE=1

TABLE OF PROP BY INV

PROP / INV (FREQUENCY, CELL CHI2, PERCENT, ROW PCT, COL PCT)	0	1	6	TOTAL
1 — FREQUENCY	109	1	4	114
CELL CHI2	0.0	0.0	0.6	
PERCENT	93.16	0.85	3.42	97.44
ROW PCT	95.61	0.88	3.51	
COL PCT	99.09	100.00	66.67	
2 — FREQUENCY	1	0	2	3
CELL CHI2	1.2	0.0	22.2	
PERCENT	0.85	0.00	1.71	2.56
ROW PCT	33.33	0.00	66.67	
COL PCT	0.91	0.00	33.33	
TOTAL	110	1	6	117
	94.02	0.85	5.13	100.00

STATISTICAL ANALYSIS SYSTEM 22:28 WEDNESDAY, DECEMBER 21, 1977 15

ZONE=2

TABLE OF SPECIES BY INV

SPECIES / INV (FREQUENCY, CELL CHI2, PERCENT, ROW PCT, COL PCT)	0	1	2	3	5	6	7	9	13	14	TOTAL
1	42	0	2	1	1	71	1	21	2	2	151
	2.3	2.7	3.1	2.3	1.1	4.5	0.4	0.2	2.2	0.2	
	3.43	0.00	0.16	0.08	0.08	5.79	0.08	1.71	0.16	0.16	12.32
	27.81	0.00	1.32	0.66	0.66	47.02	0.66	13.91	1.32	1.32	
	9.74	0.00	40.00	50.00	33.33	15.85	6.67	11.29	33.33	8.70	
2	47	4	0	1	0	52	1	20	2	3	145
	0.3	0.8	0.6	2.5	0.4	0.0	0.3	0.2	2.3	0.0	
	3.83	0.33	0.00	0.08	0.00	4.24	0.08	1.63	0.16	0.24	11.83
	32.41	2.76	0.00	0.69	0.00	35.86	0.69	13.79	1.38	2.07	
	10.90	18.18	0.00	50.00	0.00	11.61	6.67	10.75	33.33	13.04	
3	21	4	0	0	0	65	0	16	0	2	113
	8.8	1.9	0.5	0.2	0.3	13.6	1.4	0.1	0.6	0.0	
	1.71	0.33	0.00	0.00	0.00	5.30	0.00	1.31	0.00	0.16	9.22
	18.58	3.54	0.00	0.00	0.00	57.52	0.00	14.16	0.00	1.77	
	4.87	18.18	0.00	0.00	0.00	14.51	0.00	8.60	0.00	8.70	
4	36	2	0	0	1	46	1	17	0	1	111
	0.2	0.0	0.5	0.2	2.0	0.7	0.1	0.0	0.5	0.6	
	2.94	0.16	0.00	0.00	0.08	3.75	0.08	1.39	0.00	0.08	9.05
	32.43	1.80	0.00	0.00	0.90	41.44	0.90	15.32	0.00	0.90	
	8.35	9.09	0.00	0.00	33.33	10.27	6.67	9.14	0.00	4.35	
TOTAL	431	22	5	2	3	448	15	186	6	23	1226
	35.15	1.79	0.41	0.16	0.24	36.54	1.22	15.17	0.49	1.88	100.00

(CONTINUED)

ZONE=2

TABLE OF SPECIES BY INV

SPECIES   INV

FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	1	2	3	5	6	7	9	13	14	TOTAL
5	161 108.3 13.13 78.16 37.35	0 3.7 0.00 0.00 0.00	0 0.8 0.00 0.00 0.00	0 0.3 0.00 0.00 0.00	0 0.5 0.00 0.00 0.00	11 54.9 0.90 5.34 2.46	0 2.5 0.00 0.00 0.00	25 1.3 2.04 12.14 13.44	0 1.0 0.00 0.00 0.00	2 0.9 0.16 0.97 8.70	206 16.80
6	57 0.8 4.65 39.58 13.23	2 0.1 0.16 1.39 9.09	1 0.3 0.08 0.69 20.00	0 0.2 0.00 0.00 0.00	1 1.2 0.08 0.69 33.33	54 0.0 4.40 37.50 12.05	2 0.0 0.16 1.39 13.33	20 0.2 1.63 13.89 10.75	0 0.7 0.00 0.00 0.00	0 2.7 0.00 0.00 0.00	144 11.75
7	37 0.8 3.02 30.33 8.58	1 0.6 0.08 0.82 4.55	2 4.5 0.16 1.64 40.00	0 0.2 0.00 0.00 0.00	0 0.3 0.00 0.00 0.00	47 0.1 3.83 38.52 10.49	0 1.5 0.00 0.00 0.00	20 0.1 1.63 16.39 10.75	2 3.3 0.16 1.64 33.33	1 0.7 0.08 0.82 4.35	122 9.95
8	30 33.2 2.45 12.82 6.96	9 5.5 0.73 3.85 40.91	0 1.0 0.00 0.00 0.00	0 0.4 0.00 0.00 0.00	0 0.6 0.00 0.00 0.00	102 3.2 8.32 43.59 22.77	10 17.8 0.82 4.27 66.67	47 3.7 3.83 20.09 25.27	0 1.1 0.00 0.00 0.00	12 13.2 0.98 5.13 52.17	234 19.09
TOTAL	431 35.15	22 1.79	5 0.41	2 0.16	3 0.24	448 36.54	15 1.22	186 15.17	6 0.49	23 1.88	1226 100.00

(CONTINUED)

ZONE=2

TABLE OF SPECIES BY INV

SPECIES / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	15	16	17	18	19	22	23	24	25	26	TOTAL
1	0 0.2 0.00 0.00 0.00	0 0.9 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 0.5 0.00 0.00 0.00	3 0.0 0.24 1.99 11.11	1 1.1 0.08 0.66 33.33	0 0.4 0.00 0.00 0.00	2 0.1 0.16 1.32 15.38	2 0.3 0.16 1.32 8.33	0 0.1 0.00 0.00 0.00	151 12.32
2	0 0.2 0.00 0.00 0.00	3 5.7 0.24 2.07 42.86	1 6.6 0.08 0.69 100.00	0 0.5 0.00 0.00 0.00	5 1.0 0.41 3.45 18.52	0 0.4 0.00 0.00 0.00	1 1.2 0.08 0.69 33.33	2 0.1 0.16 1.38 15.38	3 0.0 0.24 2.07 12.50	0 0.1 0.00 0.00 0.00	145 11.83
3	1 3.6 0.08 0.88 50.00	0 0.6 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 0.4 0.00 0.00 0.00	0 2.5 0.00 0.00 0.00	1 1.9 0.08 0.88 33.33	0 0.3 0.00 0.00 0.00	1 0.0 0.08 0.88 7.69	2 0.0 0.16 1.77 8.33	0 0.1 0.00 0.00 0.00	113 9.22
4	0 0.2 0.00 0.00 0.00	0 0.6 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 0.4 0.00 0.00 0.00	3 0.1 0.24 2.70 11.11	1 2.0 0.08 0.90 33.33	0 0.3 0.00 0.00 0.00	2 0.6 0.16 1.80 15.38	1 0.6 0.08 0.90 4.17	0 0.1 0.00 0.00 0.00	111 9.05
TOTAL	2 0.16	7 0.57	1 0.08	4 0.33	27 2.20	3 0.24	3 0.24	13 1.06	24 1.96	1 0.08	1226 100.00

(CONTINUED)

ZONE=2

TABLE OF SPECIES BY INV

SPECIES / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	15	16	17	18	19	22	23	24	25	26	TOTAL
5	1 1.3 0.08 0.49 50.00	0 1.2 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	0 0.7 0.00 0.00 0.00	0 4.5 0.00 0.00 0.00	0 0.5 0.00 0.00 0.00	0 0.5 0.00 0.00 0.00	3 0.3 0.24 1.46 23.08	3 0.3 0.24 1.46 12.50	0 0.2 0.00 0.00 0.00	206 16.80
6	0 0.2 0.00 0.00 0.00	0 0.8 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 0.5 0.00 0.00 0.00	1 1.5 0.08 0.69 3.70	0 0.4 0.00 0.00 0.00	1 1.2 0.08 0.69 33.33	0 1.5 0.00 0.00 0.00	4 0.5 0.33 2.78 16.67	1 6.6 0.08 0.69 100.00	144 11.75
7	0 0.2 0.00 0.00 0.00	0 0.7 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 0.4 0.00 0.00 0.00	4 0.6 0.33 3.28 14.81	0 0.3 0.00 0.00 0.00	0 0.3 0.00 0.00 0.00	2 0.4 0.16 1.64 15.38	6 5.5 0.49 4.92 25.00	0 0.1 0.00 0.00 0.00	122 9.95
8	0 0.4 0.00 0.00 0.00	4 5.3 0.33 1.71 57.14	0 0.2 0.00 0.00 0.00	4 13.7 0.33 1.71 100.00	11 6.6 0.90 4.70 40.74	0 0.6 0.00 0.00 0.00	1 0.3 0.08 0.43 33.33	1 0.9 0.08 0.43 7.69	3 0.5 0.24 1.28 12.50	0 0.2 0.00 0.00 0.00	234 19.09
TOTAL	2 0.16	7 0.57	1 0.08	4 0.33	27 2.20	3 0.24	3 0.24	13 1.06	24 1.96	1 0.08	1226 100.00

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S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   22:28 WEDNESDAY, DECEMBER 21, 1977 20

ZONE=2

TABLE OF FERT BY INV

FERT / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	1	2	3	5	6	7	9	13	14	TOTAL
1	94 0.5 7.67 37.75 21.81	2 1.4 0.16 0.80 9.09	1 0.0 0.08 0.40 20.00	0 0.4 0.00 0.00 0.00	1 0.3 0.08 0.40 33.33	97 0.4 7.91 38.96 21.65	1 1.4 0.08 0.40 6.67	34 0.4 2.77 13.65 18.28	1 0.0 0.08 0.40 16.67	6 0.4 0.49 2.41 26.09	249 20.31
2	83 0.1 6.77 34.30 19.26	6 0.6 0.49 2.48 27.27	3 4.1 0.24 1.24 60.00	0 0.4 0.00 0.00 0.00	0 0.6 0.00 0.00 0.00	91 0.1 7.42 37.60 20.31	3 0.0 0.24 1.24 20.00	30 1.2 2.45 12.40 16.13	0 1.2 0.00 0.00 0.00	5 0.0 0.41 2.07 21.74	242 19.74
3	82 0.8 6.69 38.86 19.03	3 0.2 0.24 1.42 13.64	1 0.0 0.08 0.47 20.00	1 1.2 0.08 0.47 50.00	0 0.5 0.00 0.00 0.00	72 0.3 5.87 34.12 16.07	3 0.1 0.24 1.42 20.00	33 0.0 2.69 15.64 17.74	1 0.0 0.08 0.47 16.67	3 0.2 0.24 1.42 13.04	211 17.21
4	91 1.3 7.42 31.16 21.11	8 1.5 0.65 2.74 36.36	0 1.2 0.00 0.00 0.00	1 0.6 0.08 0.34 50.00	1 0.1 0.08 0.34 33.33	94 1.5 7.67 32.19 20.98	7 3.3 0.57 2.40 46.67	48 0.3 3.92 16.44 25.81	3 1.7 0.24 1.03 50.00	5 0.0 0.41 1.71 21.74	292 23.82
5	81 0.0 6.61 34.91 18.79	3 0.3 0.24 1.29 13.64	0 0.9 0.00 0.00 0.00	0 0.4 0.00 0.00 0.00	1 0.3 0.08 0.43 33.33	94 1.0 7.67 40.52 20.98	1 1.2 0.08 0.43 6.67	41 1.0 3.34 17.67 22.04	1 0.0 0.08 0.43 16.67	4 0.0 0.33 1.72 17.39	232 18.92
TOTAL	411 33.52	22 1.79	5 0.41	2 0.16	3 0.24	448 36.54	15 1.22	186 15.17	6 0.49	23 1.88	1226 100.00

(CONTINUED)

STATISTICAL ANALYSIS SYSTEM 22:28 WEDNESDAY, DECEMBER 21, 1977

ZONE=2

TABLE OF FERT BY INV

FERT / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	15	16	17	18	19	22	23	24	25	26	TOTAL
1	1 0.9 0.08 0.40 50.00	0 1.4 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	0 0.8 0.00 0.00 0.00	0 5.5 0.00 0.00 0.00	1 0.3 0.08 0.40 33.33	0 0.6 0.00 0.00 0.00	4 0.7 0.33 1.61 30.77	6 0.3 0.49 2.41 25.00	0 0.2 0.00 0.00 0.00	249 20.31
2	1 0.9 0.08 0.41 50.00	3 1.9 0.24 1.24 42.86	0 0.2 0.00 0.00 0.00	0 0.8 0.00 0.00 0.00	9 2.5 0.73 3.72 33.33	1 0.3 0.08 0.41 33.33	0 0.6 0.00 0.00 0.00	3 0.1 0.24 1.24 23.08	4 0.1 0.33 1.65 16.67	0 0.2 0.00 0.00 0.00	242 19.74
3	0 0.3 0.00 0.00 0.00	0 1.2 0.00 0.00 0.00	1 4.3 0.08 0.47 100.00	0 0.7 0.00 0.00 0.00	2 1.5 0.16 0.95 7.41	0 0.5 0.00 0.00 0.00	0 0.5 0.00 0.00 0.00	3 0.3 0.24 1.42 23.08	6 0.8 0.49 2.84 25.00	0 0.2 0.00 0.00 0.00	211 17.21
4	0 0.5 0.00 0.00 0.00	4 3.3 0.33 1.37 57.14	0 0.2 0.00 0.00 0.00	4 9.7 0.33 1.37 100.00	16 14.2 1.31 5.48 59.26	1 0.1 0.08 0.34 33.33	2 2.3 0.16 0.68 66.67	2 0.4 0.16 0.68 15.38	4 0.5 0.33 1.37 16.67	1 2.4 0.08 0.34 100.00	292 23.82
5	0 0.4 0.00 0.00 0.00	0 1.3 0.00 0.00 0.00	0 0.2 0.00 0.00 0.00	0 0.8 0.00 0.00 0.00	0 5.1 0.00 0.00 0.00	0 0.6 0.00 0.00 0.00	1 0.1 0.08 0.43 33.33	1 0.9 0.08 0.43 7.69	4 0.1 0.33 1.72 16.67	0 0.2 0.00 0.00 0.00	232 18.92
TOTAL	2 0.16	7 0.57	1 0.08	4 0.33	27 2.20	3 0.24	3 0.24	13 1.06	24 1.96	1 0.08	1226 100.00

ZONE=2

TABLE OF PROP BY INV

PROP INV

FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	1	2	3	5	6	7	9	13	14	TOTAL
1	352 43.8 28.71 49.93 81.67	10 0.6 0.82 1.42 45.45	0 2.9 0.00 0.00 0.00	1 0.0 0.08 0.14 50.00	1 0.3 0.08 0.14 33.33	212 8.1 17.29 30.07 47.32	6 0.8 0.49 0.85 40.00	80 6.8 6.53 11.35 43.01	5 0.7 0.41 0.71 83.33	10 0.8 0.82 1.42 43.48	705 57.50
2	79 59.2 6.44 15.16 18.33	12 0.8 0.98 2.30 54.55	5 3.9 0.41 0.96 100.00	1 0.0 0.08 0.19 50.00	2 0.4 0.16 0.38 66.67	236 10.9 19.25 45.30 52.68	9 1.1 0.73 1.73 60.00	106 9.2 8.65 20.35 56.99	1 0.9 0.08 0.19 16.67	13 1.1 1.06 2.50 56.52	521 42.50
TOTAL	431 35.15	22 1.79	5 0.41	2 0.16	3 0.24	448 36.54	15 1.22	186 15.17	6 0.49	23 1.88	1226 100.00

(CONTINUED)

TABLE OF PROP BY INV

PROP INV

FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	15	16	17	18	19	22	23	24	25	26	TOTAL
1	2 0.6 0.16 0.28 100.00	0 4.0 0.00 0.00 0.00	1 0.3 0.08 0.14 100.00	1 0.7 0.08 0.14 25.00	7 4.7 0.57 0.99 25.93	2 0.0 0.16 0.28 66.67	0 1.7 0.00 0.00 0.00	4 1.6 0.33 0.57 30.77	11 0.6 0.90 1.56 45.83	0 0.6 0.00 0.00 0.00	705 57.50
2	0 0.8 0.00 0.00 0.00	7 5.4 0.57 1.34 100.00	0 0.4 0.00 0.00 0.00	3 1.0 0.24 0.58 75.00	20 6.3 1.63 3.84 74.07	1 0.1 0.08 0.19 33.33	3 2.3 0.24 0.58 100.00	9 2.2 0.73 1.73 69.23	13 0.8 1.06 2.50 54.17	1 0.8 0.08 0.19 100.00	521 42.50
TOTAL	2 0.16	7 0.57	1 0.08	4 0.33	27 2.20	3 0.24	3 0.24	13 1.06	24 1.96	1 0.08	1226 100.00

ZONE=3

TABLE OF SPECIES BY INV

SPECIES / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	1	2	3	4	5	6	7	8	TOTAL
1	129 6.5 4.88 39.81 15.34	13 4.5 0.49 4.01 6.84	7 1.6 0.26 2.16 7.61	33 0.2 1.25 10.19 11.30	2 1.5 0.08 0.62 28.57	1 0.2 0.04 0.31 20.00	18 0.3 0.68 5.56 14.06	3 0.6 0.11 0.93 18.75	26 16.8 0.98 8.02 26.80	324 12.25
2	135 10.1 5.11 41.80 16.05	30 2.0 1.13 9.29 15.79	14 0.7 0.53 4.33 15.22	6 24.7 0.23 1.86 2.05	0 0.9 0.00 0.00 0.00	0 0.6 0.00 0.00 0.00	9 2.8 0.34 2.79 7.03	1 0.5 0.04 0.31 6.25	7 2.0 0.26 2.17 7.22	323 12.22
3	67 12.1 2.53 20.87 7.97	29 1.5 1.10 9.03 15.26	15 1.3 0.57 4.67 16.30	61 18.4 2.31 19.00 20.89	3 5.4 0.11 0.93 42.86	0 0.6 0.00 0.00 0.00	14 0.2 0.53 4.36 10.94	1 0.5 0.04 0.31 6.25	17 2.3 0.64 5.30 17.53	321 12.14
4	101 0.0 3.82 31.86 12.01	21 0.1 0.79 6.62 11.05	12 0.1 0.45 3.79 13.04	41 1.0 1.55 12.93 14.04	1 0.0 0.04 0.32 14.29	2 3.3 0.08 0.63 40.00	22 2.9 0.83 6.94 17.19	1 0.4 0.04 0.32 6.25	11 0.0 0.42 3.47 11.34	317 11.99
TOTAL	841 31.81	190 7.19	92 3.48	292 11.04	7 0.26	5 0.19	128 4.84	16 0.61	97 3.67	2644 100.00

(CONTINUED)

S T A T I S T I C A L   A N A L Y S I S   S Y S T E M   22:28 WEDNESDAY, DECEMBER 21, 1977   26

ZONE=3

TABLE OF SPECIES BY INV

SPECIES / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	1	2	3	4	5	6	7	8	TOTAL
5	139 17.2 5.26 45.13 16.53	18 0.8 0.68 5.84 9.47	3 5.6 0.11 0.97 3.26	38 0.5 1.44 12.34 13.01	0 0.8 0.00 0.00 0.00	1 0.3 0.04 0.32 20.00	6 5.3 0.23 1.95 4.69	0 1.9 0.00 0.00 0.00	8 1.0 0.30 2.60 8.25	308 11.65
6	119 3.5 4.50 37.78 14.15	33 4.7 1.25 10.48 17.37	8 0.8 0.30 2.54 8.70	28 1.3 1.06 8.89 9.59	1 0.0 0.04 0.32 14.29	0 0.6 0.00 0.00 0.00	14 0.1 0.53 4.44 10.94	3 0.6 0.11 0.95 18.75	7 1.8 0.26 2.22 7.22	315 11.91
7	142 22.7 5.37 47.33 16.88	20 0.1 0.76 6.67 10.53	13 0.6 0.49 4.33 14.13	9 17.6 0.34 3.00 3.08	0 0.8 0.00 0.00 0.00	1 0.3 0.04 0.33 20.00	27 10.7 1.02 9.00 21.09	4 2.6 0.15 1.33 25.00	5 3.3 0.19 1.67 5.15	300 11.35
8	9 121.3 0.34 2.06 1.07	26 0.9 0.98 5.96 13.68	20 1.5 0.76 4.59 21.74	76 16.1 2.87 17.43 26.03	0 1.2 0.00 0.00 0.00	0 0.8 0.00 0.00 0.00	18 0.5 0.68 4.13 14.06	3 0.0 0.11 0.69 18.75	16 0.0 0.61 3.67 16.49	436 16.49
TOTAL	841 31.81	190 7.19	92 3.48	292 11.04	7 0.26	5 0.19	128 4.84	16 0.61	97 3.67	2644 100.00

(CONTINUED)

ZONE=3

TABLE OF SPECIES BY INV

SPECIES	INV	9	10	11	12	13	14	15	16	18	TOTAL
1	FREQUENCY	29	6	0	0	16	5	4	2	0	324
	CELL CHI2	2.9	1.7	0.6	0.4	0.2	3.5	0.0	3.1	0.5	
	PERCENT	1.10	0.23	0.00	0.00	0.61	0.19	0.15	0.08	0.00	12.25
	ROW PCT	8.95	1.85	0.00	0.00	4.94	1.54	1.23	0.62	0.00	
	COL PCT	8.95	20.69	0.00	0.00	13.79	5.43	11.43	40.00	0.00	
2	FREQUENCY	42	8	0	1	10	8	9	0	2	323
	CELL CHI2	0.1	5.6	0.6	1.1	1.2	0.9	5.2	0.6	4.7	
	PERCENT	1.59	0.30	0.00	0.04	0.38	0.30	0.34	0.00	0.08	12.22
	ROW PCT	13.00	2.48	0.00	0.31	3.10	2.48	2.79	0.00	0.62	
	COL PCT	12.96	27.59	0.00	33.33	8.62	8.70	25.71	0.00	50.00	
3	FREQUENCY	35	2	0	1	16	9	3	1	0	321
	CELL CHI2	0.5	0.7	0.6	1.1	0.3	0.4	0.4	0.3	0.5	
	PERCENT	1.32	0.08	0.00	0.04	0.61	0.34	0.11	0.04	0.00	12.14
	ROW PCT	10.90	0.62	0.00	0.31	4.98	2.80	0.93	0.31	0.00	
	COL PCT	10.80	6.90	0.00	33.33	13.79	9.78	8.57	20.00	0.00	
4	FREQUENCY	36	3	0	1	18	7	3	2	0	317
	CELL CHI2	0.2	0.1	0.6	1.1	1.2	1.5	0.3	3.3	0.5	
	PERCENT	1.36	0.11	0.00	0.04	0.68	0.26	0.11	0.08	0.00	11.99
	ROW PCT	11.36	0.95	0.00	0.32	5.68	2.21	0.95	0.63	0.00	
	COL PCT	11.11	10.34	0.00	33.33	15.52	7.61	8.57	40.00	0.00	
TOTAL		324	29	5	3	116	92	35	5	4	2644
		12.25	1.10	0.19	0.11	4.39	3.48	1.32	0.19	0.15	100.00

(CONTINUED)

ZONE=3

TABLE OF SPECIES BY INV

SPECIES FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	INV 9	10	11	12	13	14	15	16	18	TOTAL
5	26 3.7 0.98 8.44 8.02	1 1.7 0.04 0.32 3.45	0 0.6 0.00 0.00 0.00	0 0.3 0.00 0.00 0.00	16 0.5 0.61 5.19 13.79	10 0.0 0.38 3.25 10.87	4 0.0 0.15 1.30 11.43	0 0.6 0.00 0.00 0.00	0 0.5 0.00 0.00 0.00	308 11.65
6	38 0.0 1.44 12.06 11.73	2 0.6 0.08 0.63 6.90	0 0.6 0.00 0.00 0.00	0 0.4 0.00 0.00 0.00	14 0.0 0.53 4.44 12.07	7 1.4 0.26 2.22 7.61	5 0.2 0.19 1.59 14.29	0 0.6 0.00 0.00 0.00	1 0.6 0.04 0.32 25.00	315 11.91
7	32 0.6 1.21 10.67 9.88	3 0.0 0.11 1.00 10.34	0 0.6 0.00 0.00 0.00	0 0.3 0.00 0.00 0.00	6 3.9 0.23 2.00 5.17	9 0.2 0.34 3.00 9.78	3 0.2 0.11 1.00 8.57	0 0.6 0.00 0.00 0.00	0 0.5 0.00 0.00 0.00	300 11.35
8	86 19.9 3.25 19.72 26.54	4 0.1 0.15 0.92 13.79	5 21.1 0.19 1.15 100.00	0 0.5 0.00 0.00 0.00	20 0.0 0.76 4.59 17.24	37 31.4 1.40 8.49 40.22	4 0.5 0.15 0.92 11.43	0 0.8 0.00 0.00 0.00	1 0.2 0.04 0.23 25.00	436 16.49
TOTAL	324 12.25	29 1.10	5 0.19	3 0.11	116 4.39	92 3.48	35 1.32	5 0.19	4 0.15	2644 100.00

(CONTINUED)

ZONE=3

TABLE OF SPECIES BY INV

SPECIES / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	19	20	21	23	24	25	26	27	TOTAL
1	7 0.9 0.26 2.16 8.54	1 0.2 0.04 0.31 20.00	0 0.1 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	6 2.2 0.23 1.85 6.74	14 1.2 0.53 4.32 9.15	0 3.2 0.00 0.00 0.00	2 2.2 0.08 0.62 33.33	324 12.25
2	5 2.5 0.19 1.55 6.10	0 0.6 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	16 2.4 0.61 4.95 17.98	15 0.7 0.57 4.64 9.80	2 0.4 0.08 0.62 7.69	3 7.0 0.11 0.93 50.00	323 12.22
3	11 0.1 0.42 3.43 13.41	0 0.6 0.00 0.00 0.00	1 6.4 0.04 0.31 100.00	0 0.1 0.00 0.00 0.00	14 0.9 0.53 4.36 15.73	18 0.0 0.68 5.61 11.76	3 0.0 0.11 0.93 11.54	0 0.7 0.00 0.00 0.00	321 12.14
4	10 0.0 0.38 3.15 12.20	0 0.6 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	0 0.1 0.00 0.00 0.00	9 0.3 0.34 2.84 10.11	15 0.6 0.57 4.73 9.80	1 1.4 0.04 0.32 3.85	0 0.7 0.00 0.00 0.00	317 11.99
TOTAL	82 3.10	5 0.19	1 0.04	1 0.04	89 3.37	153 5.79	26 0.98	6 0.23	2644 100.00

(CONTINUED)

STATISTICAL ANALYSIS SYSTEM 22:28 WEDNESDAY, DECEMBER 21, 1977 30

ZONE=3

TABLE OF SPECIES BY INV

SPECIES	FREQUENCY / CELL CHI2 / PERCENT / ROW PCT / COL PCT	INV 19	20	21	23	24	25	26	27	TOTAL
5	FREQUENCY	11	0	0	0	10	11	5	1	308
	CELL CHI2	0.2	0.6	0.1	0.1	0.0	2.6	1.3	0.1	
	PERCENT	0.42	0.00	0.00	0.00	0.38	0.42	0.19	0.04	11.65
	ROW PCT	3.57	0.00	0.00	0.00	3.25	3.57	1.62	0.32	
	COL PCT	13.41	0.00	0.00	0.00	11.24	7.19	19.23	16.67	
6	FREQUENCY	18	0	0	0	10	6	1	0	315
	CELL CHI2	6.9	0.6	0.1	0.1	0.0	8.2	1.4	0.7	
	PERCENT	0.68	0.00	0.00	0.00	0.38	0.23	0.04	0.00	11.91
	ROW PCT	5.71	0.00	0.00	0.00	3.17	1.90	0.32	0.00	
	COL PCT	21.95	0.00	0.00	0.00	11.24	3.92	3.85	0.00	
7	FREQUENCY	5	1	0	1	7	12	0	0	300
	CELL CHI2	2.0	0.3	0.1	6.9	1.0	1.7	3.0	0.7	
	PERCENT	0.19	0.04	0.00	0.04	0.26	0.45	0.00	0.00	11.35
	ROW PCT	1.67	0.33	0.00	0.33	2.33	4.00	0.00	0.00	
	COL PCT	6.10	20.00	0.00	100.00	7.87	7.84	0.00	0.00	
8	FREQUENCY	15	3	0	0	17	62	14	0	436
	CELL CHI2	0.2	5.7	0.2	0.2	0.4	53.6	22.0	1.0	
	PERCENT	0.57	0.11	0.00	0.00	0.64	2.34	0.53	0.00	16.49
	ROW PCT	3.44	0.69	0.00	0.00	3.90	14.22	3.21	0.00	
	COL PCT	18.29	60.00	0.00	0.00	19.10	40.52	53.85	0.00	
TOTAL		82	5	1	1	89	153	26	6	2644
		3.10	0.19	0.04	0.04	3.37	5.79	0.98	0.23	100.00

ZONE=3

TABLE OF FERT BY INV

FERT / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	0	1	2	3	4	5	6	7	8	TOTAL
1	169	39	13	63	2	1	24	4	22	551
	0.2	0.0	2.0	0.1	0.2	0.0	0.3	0.1	0.2	
	6.39	1.48	0.49	2.38	0.08	0.04	0.91	0.15	0.83	20.84
	30.67	7.08	2.36	11.43	0.36	0.18	4.36	0.73	3.99	
	20.10	20.53	14.13	21.58	28.57	20.00	18.75	25.00	22.68	
2	168	32	16	57	1	1	33	4	19	513
	0.1	0.6	0.2	0.0	0.1	0.0	2.7	0.3	0.0	
	6.35	1.21	0.61	2.16	0.04	0.04	1.25	0.15	0.72	19.40
	32.75	6.24	3.12	11.11	0.19	0.19	6.43	0.78	3.70	
	19.98	16.84	17.39	19.52	14.29	20.00	25.78	25.00	19.59	
3	135	47	18	53	1	1	21	2	26	501
	3.7	3.4	0.0	0.1	0.1	0.0	0.4	0.4	3.2	
	5.11	1.78	0.68	2.00	0.04	0.04	0.79	0.08	0.98	18.95
	26.95	9.38	3.59	10.58	0.20	0.20	4.19	0.40	5.19	
	16.05	24.74	19.57	18.15	14.29	20.00	16.41	12.50	26.80	
4	188	30	19	42	2	1	24	2	17	520
	3.1	1.5	0.0	4.1	0.3	0.0	0.1	0.4	0.2	
	7.11	1.13	0.72	1.59	0.08	0.04	0.91	0.08	0.64	19.67
	36.15	5.77	3.65	8.08	0.38	0.19	4.62	0.38	3.27	
	22.35	15.79	20.65	14.38	28.57	20.00	18.75	12.50	17.53	
5	181	42	26	77	1	1	26	4	13	559
	0.1	0.1	2.2	3.8	0.2	0.0	0.0	0.1	2.7	
	6.85	1.59	0.98	2.91	0.04	0.04	0.98	0.15	0.49	21.14
	32.38	7.51	4.65	13.77	0.18	0.18	4.65	0.72	2.33	
	21.52	22.11	28.26	26.37	14.29	20.00	20.31	25.00	13.40	
TOTAL	841	190	92	292	7	5	128	16	97	2644
	31.81	7.19	3.48	11.04	0.26	0.19	4.84	0.61	3.67	100.00

(CONTINUED)

STATISTICAL ANALYSIS SYSTEM   22:28 WEDNESDAY, DECEMBER 21, 1977   33

ZONE=3

TABLE OF FERT BY INV

FERT	INV	9	10	11	12	13	14	15	16	18	TOTAL
1	FREQUENCY	63	8	1	0	23	21	6	0	1	551
	CELL CHI2	0.3	0.6	0.0	0.6	0.1	0.2	0.2	1.0	0.0	
	PERCENT	2.38	0.30	0.04	0.00	0.87	0.79	0.23	0.00	0.04	20.84
	ROW PCT	11.43	1.45	0.18	0.00	4.17	3.81	1.09	0.00	0.18	
	COL PCT	19.44	27.59	20.00	0.00	19.83	22.83	17.14	0.00	25.00	
2	FREQUENCY	60	3	1	1	24	17	10	1	0	513
	CELL CHI2	0.1	1.2	0.0	0.3	0.1	0.0	1.5	0.0	0.8	
	PERCENT	2.27	0.11	0.04	0.04	0.91	0.64	0.38	0.04	0.00	19.40
	ROW PCT	11.70	0.58	0.19	0.19	4.68	3.31	1.95	0.19	0.00	
	COL PCT	18.52	10.34	20.00	33.33	20.69	18.48	28.57	20.00	0.00	
3	FREQUENCY	69	3	2	1	30	12	6	2	1	501
	CELL CHI2	0.9	1.1	1.2	0.3	2.9	1.7	0.1	1.2	0.1	
	PERCENT	2.61	0.11	0.08	0.04	1.13	0.45	0.23	0.08	0.04	18.95
	ROW PCT	13.77	0.60	0.40	0.20	5.99	2.40	1.20	0.40	0.20	
	COL PCT	21.30	10.34	40.00	33.33	25.86	13.04	17.14	40.00	25.00	
4	FREQUENCY	68	4	1	1	23	22	3	0	0	520
	CELL CHI2	0.3	0.5	0.0	0.3	0.0	0.8	2.2	1.0	0.8	
	PERCENT	2.57	0.15	0.04	0.04	0.87	0.83	0.11	0.00	0.00	19.67
	ROW PCT	13.08	0.77	0.19	0.19	4.42	4.23	0.58	0.00	0.00	
	COL PCT	20.99	13.79	20.00	33.33	19.83	23.91	8.57	0.00	0.00	
5	FREQUENCY	64	11	0	0	16	20	10	2	2	559
	CELL CHI2	0.3	3.9	1.1	0.6	3.0	0.0	0.9	0.8	1.6	
	PERCENT	2.42	0.42	0.00	0.00	0.61	0.76	0.38	0.08	0.08	21.14
	ROW PCT	11.45	1.97	0.00	0.00	2.86	3.58	1.79	0.36	0.36	
	COL PCT	19.75	37.93	0.00	0.00	13.79	21.74	28.57	40.00	50.00	
TOTAL		324	29	5	3	116	92	35	5	4	2644
		12.25	1.10	0.19	0.11	4.39	3.48	1.32	0.19	0.15	100.00

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TABLE OF FERT BY INV

FERT	FREQUENCY / CELL CHI2 / PERCENT / ROW PCT / COL PCT	INV 19	20	21	23	24	25	26	27	TOTAL
1	FREQUENCY	22	4	1	0	20	34	7	3	551
	CELL CHI2	1.4	8.4	3.0	0.2	0.1	0.1	0.5	2.4	
	PERCENT	0.83	0.15	0.04	0.00	0.76	1.29	0.26	0.11	20.84
	ROW PCT	3.99	0.73	0.18	0.00	3.63	6.17	1.27	0.54	
	COL PCT	26.83	80.00	100.00	0.00	22.47	22.22	26.92	50.00	
2	FREQUENCY	12	0	0	0	13	33	6	1	513
	CELL CHI2	1.0	1.0	0.2	0.2	1.1	0.4	0.2	0.0	
	PERCENT	0.45	0.00	0.00	0.00	0.49	1.25	0.23	0.04	19.40
	ROW PCT	2.34	0.00	0.00	0.00	2.53	6.43	1.17	0.19	
	COL PCT	14.63	0.00	0.00	0.00	14.61	21.57	23.08	16.67	
3	FREQUENCY	15	1	0	0	22	27	6	0	501
	CELL CHI2	0.0	0.0	0.2	0.2	1.6	0.1	0.2	1.1	
	PERCENT	0.57	0.04	0.00	0.00	0.83	1.02	0.23	0.00	18.95
	ROW PCT	2.99	0.20	0.00	0.00	4.39	5.39	1.20	0.00	
	COL PCT	18.29	20.00	0.00	0.00	24.72	17.65	23.08	0.00	
4	FREQUENCY	13	0	0	1	21	32	5	1	520
	CELL CHI2	0.6	1.0	0.2	3.3	0.7	0.1	0.0	0.0	
	PERCENT	0.49	0.00	0.00	0.04	0.79	1.21	0.19	0.04	19.67
	ROW PCT	2.50	0.00	0.00	0.19	4.04	6.15	0.96	0.19	
	COL PCT	15.85	0.00	0.00	100.00	23.60	20.92	19.23	16.67	
5	FREQUENCY	20	0	0	0	13	27	2	1	559
	CELL CHI2	0.4	1.1	0.2	0.2	1.8	0.9	2.2	0.1	
	PERCENT	0.76	0.00	0.00	0.00	0.49	1.02	0.08	0.04	21.14
	ROW PCT	3.58	0.00	0.00	0.00	2.33	4.83	0.36	0.18	
	COL PCT	24.39	0.00	0.00	0.00	14.61	17.65	7.69	16.67	
TOTAL		82	5	1	1	89	153	26	6	2644
		3.10	0.19	0.04	0.04	3.37	5.79	0.98	0.23	100.00

STATISTICAL ANALYSIS SYSTEM 22:28 WEDNESDAY, DECEMBER 21, 1977 36

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TABLE OF PROP BY INV

PROP / FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	INV 0	1	2	3	4	5	6	7	8	TOTAL
1	694 78.2 26.25 44.43 82.52	98 1.8 3.71 6.27 51.58	27 13.8 1.02 1.73 29.35	123 14.2 4.65 7.87 42.12	4 0.0 0.15 0.26 57.14	1 1.3 0.04 0.06 20.00	56 5.1 2.12 3.59 43.75	5 2.1 0.19 0.32 31.25	60 0.1 2.27 3.84 61.86	1562 59.08
2	147 112.9 5.56 13.59 17.48	92 2.6 3.48 8.50 48.42	65 19.9 2.46 6.01 70.65	169 20.5 6.39 15.62 57.88	3 0.0 0.11 0.28 42.86	4 1.9 0.15 0.37 80.00	72 7.3 2.72 6.65 56.25	11 3.0 0.42 1.02 68.75	37 0.2 1.40 3.42 38.14	1082 40.92
TOTAL	841 31.81	190 7.19	92 3.48	292 11.04	7 0.26	5 0.19	128 4.84	16 0.61	97 3.67	2644 100.00

(CONTINUED)

TABLE OF PROP BY INV

PROP / FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	INV 9	10	11	12	13	14	15	16	18	TOTAL
1	151 8.5 5.71 9.67 46.60	21 0.9 0.79 1.34 72.41	1 1.3 0.04 0.06 20.00	1 0.3 0.04 0.06 33.33	57 1.9 2.16 3.65 49.14	45 1.6 1.70 2.88 48.91	19 0.1 0.72 1.22 54.29	5 1.4 0.19 0.32 100.00	4 1.1 0.15 0.26 100.00	1562 59.08
2	173 12.3 6.54 15.99 53.40	8 1.3 0.30 0.74 27.59	4 1.9 0.15 0.37 80.00	2 0.5 0.08 0.18 66.67	59 2.8 2.23 5.45 50.86	47 2.3 1.78 4.34 51.09	16 0.2 0.61 1.48 45.71	0 2.0 0.00 0.00 0.00	0 1.6 0.00 0.00 0.00	1082 40.92
TOTAL	324 12.25	29 1.10	5 0.19	3 0.11	116 4.39	92 3.48	35 1.32	5 0.19	4 0.15	2644 100.00

(CONTINUED)

ZONE=3

TABLE OF PROP BY INV

PROP / INV FREQUENCY CELL CHI2 PERCENT ROW PCT COL PCT	19	20	21	23	24	25	26	27	TOTAL
1	53 0.4 2.00 3.39 64.63	0 3.0 0.00 0.00 0.00	0 0.6 0.00 0.00 0.00	0 0.6 0.00 0.00 0.00	51 0.0 1.93 3.27 57.30	69 5.1 2.61 4.42 45.10	13 0.4 0.49 0.83 50.00	4 0.1 0.15 0.26 66.67	1562 59.08
2	29 0.6 1.10 2.68 35.37	5 4.3 0.19 0.46 100.00	1 0.9 0.04 0.09 100.00	1 0.9 0.04 0.09 100.00	38 0.1 1.44 3.51 42.70	84 7.3 3.18 7.76 54.90	13 0.5 0.49 1.20 50.00	2 0.1 0.08 0.18 33.33	1082 40.92
TOTAL	82 3.10	5 0.19	1 0.04	1 0.04	89 3.37	153 5.79	26 0.98	6 0.23	2644 100.00

APPENDIX I

BIRD SPECIES AND NUMBERS OF INDIVIDUALS OBSERVED BY SAMPLING PERIOD

Date	Time	Species	Number of Individuals	Common Name
27 May 1975	0600	Ardea herodias	1	Great Blue Heron
		Cassidix mexicanus	1	Boat-tailed Grackle
	0800	Agelaius phoeniceus	5	Red-winged Blackbird
		Rhynchops nigra	2	Black Skimmer
		Cassidix mexicanus	1	Boat-tailed Grackle--
	1000	Charadrius semipalmatus	50	Semipalmated Plover
		Agelaius phoeniceus	6	Redwinged Blackbird
		Corvus ossifragus	1	Fish Crow
	1200	Squatarola squatarola	8	Black-bellied Plover
	1400	Squatarola squatarola	60	Black-bellied Plover
		Corvus ossifragus	3	Fish Crow
		Agelaius phoeniceus	2	Redwinged Blackbird
		Rallus longirostris	1	Clapper Rail
	1600	Cassidix mexicanus	3	Boat-tailed Grackle
	1800	Agelaius phoeniceus	3	Redwinged Blackbird
		Catoptrophorus semipalmatus	1	Willet
		Corvus ossifragus	1	Fish Crow
		Rallus longirostris	1	Clapper Rail
23 July 1975	0600	Charadrius semipalmatus	5	Semipalmated Plover
		Agelaius phoeniceus	4	Redwinged Blackbird
		Rallus longirostris	1	Clapper Rail
	0800	------------------	-	------------------
	1000	Thalasseus maximus	10	Royal Tern
		Sterna hirundo	7	Common Tern
		Sterna albifrons	4	Least Tern
		Pelicanus occidentalis	2	Brown Pelican
		Butorides virescens	1	Green Heron
	1200	Charadrius semipalmatus	5	Semipalmated Plover
		Agelaius phoeniceus	1	Redwinged Blackbird
	1400	Hydroprogne caspia	2	Caspian Tern
	1600	------------------	-	------------------
	1800	Larus atricilla	25	Laughing Gull
		Hydroprogne caspia	15	Caspian Tern
		Sterna albifrons	10	Least Tern
		Rhynchops nigra	2	Black Skimmer
		Rallus longirostris	1	Clapper Rail

Date	Time	Species	Number of Individuals	Common Name
[illegible] July 1975	2000	Corvus ossifragus	25	Fish Crow
		Charadrius semipalmatus	2	Semipalmated Plover
10 Sept. 1975	0600	Haematopus palliatus	6	American Oystercatcher
		Thalasseus maximus	3	Royal Tern
		Sterna forsteri	2	Forster's Tern
		Cassidix mexicanus	1	Boat-tailed Grackle
		Rallus longirostris	1	Clapper Rail
	0800	Leucophoyx thula	2	Snowy Egret
		Cassidix mexicanus	1	Boat-tailed Grackle
		Sterna forsteri	1	Forster's Tern
		Telmatodytes palustris	1	Long-billed Marsh Wren
		Thalasseus maximus	1	Royal Tern
	1000	Hydroprogne caspia	18	Caspian Tern
		Larus atricilla	15	Laughing Gull
		Catoptrophorus semipalmatus	2	Willet
		Zenaidura macroura	2	Mourning Dove
	1200	Hydroprogne caspia	18	Caspian Tern
	1400	Hydroprogne caspia	50	Caspian Tern
		Sterna forsteri	10	Forster's Tern
		Thalasseus maximus	6	Royal Tern
		Charadrius semipalmatus	2	Semipalmated Plover
		Cassidix mexicanus	1	Boat-tailed Grackle
		Alligator mississippiensis	1	Alligator
	1600	Hydroprogne caspia	100	Caspian Tern
		Thalasseus maximus	30	Royal Tern
		Larus atricilla	35	Laughing Gull
		Sterna forsteri	2	Forster's Tern
		Agelaius phoeniceus	1	Redwinged Blackbird
		Pelicanus occidentalis	1	Brown Pelican
	1800	Hirundo rustica	3	Barn Swallow
		Telmatodytes palustris	1	Long-billed Marsh Wren
		Alligator mississippiensis	1	Alligator
5 Nov. 1975	0600	Cassidix mexicanus	38	Boat-tailed Grackle
		Catoptrophorus semipalmatus	1	Willet
		Larus atricilla	1	Laughing Gull
	0800	Charadrius semipalmatus	6	Semipalmated Plover
		Agelaius phoeniceus	3	Redwinged Blackbird
		Cassidix mexicanus	2	Boat-tailed Grackle
		Corvus ossifragus	2	Fish Crow
		Hydroprogne caspia	2	Caspian Tern
		Larus atricillus	2	Laughing Gull
		Pelicanus occidentalis	2	Brown Pelican
		Phalacrocorax auritus	2	Double-crested Cormorant
		Larus argentatus	1	Herring Gull
		Larus delawarensis	1	Ring-billed Gull
		Rallus longirostris	1	Clapper Rail

Date	Time	Species	Number of Individuals	Common Name
5 Nov. 1975	1000	Hydroprogne caspia	7	Caspian Tern
		Larus atricilla	6	Laughing Gull
		Phalacrocorax auritus	3	Double-Crested Cormorant
		Charadrius semipalmatus	2	Semipalmated Plover
		Cassidix mexicanus	1	Boat-tailed Grackle
		Coragyps atratus	1	Black Vulture
	1200	Rallus longirostris	1	Clapper Rail
	1400	Larus atricilla	1	Laughing Gull
	1600	Iridiprocne bicolor	7	Tree Swallow
		Agelaius phoeniceus	3	Redwinged Blackbird
	1800	Rallus longirostris	1	Clapper Rail
8 Jan. 1976	0600	--------------------	-	--------------------
	0800	Haematopus palliatus	34	American Oystercatcher
		Larus delawarensis	8	Ring-billed Gull
		Larus argentatus	2	Herring Gull
		Ardea herodias	1	Great Blue Heron
		Cassidix mexicanus	1	Boat-tailed Grackle
		Corvus ossifragus	1	Fish Crow
		Phalacrocorax auritus	1	Double-Crested Cormorant
	1000	Larus argentatus	14	Herring Gull
		Larus atricilla	13	Laughing Gull
		Larus delawarensis	10	Ring-billed Gull
		Phalacrocorax auritus	2	Double-Crested Cormorant
		Corvus ossifragus	1	Fish Crow
		Pelicanus occidentalis	1	Brown Pelican
		Thalasseus maximus	1	Royal Tern
	1200	Calidris canutis	4	Knot
		Branta canadensis	3	Canada Goose
		Crocethia alba	2	Sanderling
		Telamatodytes palustris	2	Long-Billed Marsh Wren
		Larus delawarensis	1	Ring-billed Gull
	1400	Larus delawarensis	15	Ring-billed Gull
		Larus atricilla	5	Laughing Gull
		Larus argentatus	3	Herring Gull
		Cassidix mexicanus	1	Boat-tailed Grackle
		Rallus longirostris	1	Clapper Rail
	1600	Larus delawarensis	5	Ring-billed Gull
		Phalacrocorax auritus	2	Double-Crested Cormorant
		Cassidix mexicanus	1	Boat-tailed Grackle
		Larus atricilla	1	Laughing Gull
		Rallus longirostris	1	Clapper Rail

Date	Time	Species	Number of Individuals	Common Name
1 March 1976	0700	Cassidix mexicanus	10	Boat-tailed Grackle
		Erolia alpina	9	Dunlin
		Larus delawarensis	5	Ring-billed Gull
		Larus argentatus	3	Herring Gull
		Rallus longirostris	2	Clapper Rail
		Calidris canutis	1	Knot
	0900	Agelaius phoenicius	50	Redwinged Blackbird
		Larus delawarensis	20	Ring-billed Gull
		Calidris canutis	6	Knot
		Cassidix mexicanus	3	Boat-tailed Grackle
		Larus argentatus	3	Herring Gull
		Erolia alpina	1	Dunlin
		Hydroprogne caspia	1	Caspian Tern
		Leucophoyx thula	1	Snowy Egret
		Megaceryle alcyon	1	Belted Kingfisher
	1100	Larus delawarensis	12	Ring-billed Gull
		Cassidix mexicanus	1	Boat-tailed Grackle
		Larus argentatus	1	Herring Gull
	1300	Larus delawarensis	5	Ring-billed Gull
		Casmerodius alba	1	Common Egret
	1500	Agelaius phoenicius	15	Redwinged Blackbird
		Larus delawarensis	11	Ring-billed Gull
		Fulica americana	5	American Coot
		Larus argentatus	4	Herring Gull
		Calidris canutis	1	Knot
		Casmerodius alba	1	Common Egret
		Cassidix mexicanus	1	Boat-tailed Grackle
		Haematopus palliatus	1	American Oystercatcher
	1700	Larus delawarensis	85	Ring-billed Gull
		Cassidix mexicanus	39	Boat-tailed Grackle
		Larus argentatus	20	Herring Gull
		Agelaius phoeniceus	5	Redwinged Blackbird
		Calidris canutis	2	Knot
		Leucophoyx thula	1	Snowy Egret
	1800	Corvus ossifragus	500	Fish Crow
		Crocethia alba	3	Sanderling
27 April 1976	0630	Hydroprogne caspia	78	Caspian Tern
		Larus delawarensis	5	Ring-billed Gull
		Thalasseus maximus	3	Royal Tern
		Cassidix mexicanus	2	Boat-tailed Grackle
		Corvus ossifragus	2	Fish Crow
		Falco columbarius	1	Pigeon Hawk

Date	Time	Species	Number of Individuals	Common Name
27 April 1976	0730	Hydroprogne caspia	70	Caspian Tern
		Larus delawarensis	9	Ring-billed Gull
		Thalasseus maximus	7	Royal Tern
		Larus argentatus	2	Herring Gull
		Cassidix mexicanus	1	Boat-tailed Grackle
	0830	Hydroprogne caspia	90	Caspian Tern
		Larus delawarensis	10	Ring-billed Gull
		Thalasseus maximus	10	Royal Tern
		Larus argentatus	2	Herring Gull
	0930	Hydroprogne caspia	106	Caspian Tern
		Larus delawarensis	19	Ring-billed Gull
		Thalasseus maximus	12	Royal Gull
		Larus argentatus	4	Herring Gull
	1030	Hydroprogne caspia	130	Caspian Tern
		Thalasseus maximus	25	Royal Tern
		Larus delawarensis	16	Ring-billed Gull
		Larus atricilla	5	Laughing Gull
		Cassidix mexicanus	1	Boat-tailed Grackle
		Sterna forsteri	1	Forster's Tern
	1130	Hydroprogne caspia	130	Caspian Tern
		Thalasseus maximus	25	Royal Tern
		Larus delawarensis	15	Ring-billed Gull
		Crocethia alba	5	Sanderling
		Charadrius semipalmatus	4	Semipalmated Plover
		Larus argentatus	1	Herring Gull
		Squatarola squatarola	1	Black-bellied Plover
	1230	Thalasseus maximus	50	Royal Tern
		Hydroprogne caspia	9	Caspian Tern
		Larus argentatus	4	Herring Gull
		Larus delawarensis	3	Ring-billed Gull
		Cassidix mexicanus	1	Boat-tailed Grackle
		Squatarola squatarola	1	Black-bellied Plover
	1330	Hydroprogne caspia	80	Caspian Tern
		Thalasseus maximus	80	Royal Tern
		Larus argentatus	5	Herring Gull
		Larus delawarensis	4	Ring-billed Gull
		Phalacrocorax auritis	2	Double-crested Cormorant
		Cassidix mexicanus	1	Boat-tailed Grackle
		Squatarola squatarola	1	Black-bellied Plover
	1430	Hydroprogne caspia	175	Caspian Tern
		Thalasseus maximus	175	Royal Tern
		Larus delawarensis	6	Ring-billed Gull
		Larus argentatus	3	Herring Gull
		Squatarola squatarola	3	Black-bellied Plover
		Leucophoyx thula	1	Snowy Egret
		Pandion haliaetus	1	Osprey
		Rallus longirostris	1	Clapper Rail

Date	Time	Species	Number of Individuals	Common Name
27 April 1976	1530	Hydroprogne Caspia	92	Caspian Tern
		Thalasseus maximus	92	Royal Tern
		Larus delawarensis	8	Ring-billed Gull
		Squatarola squatarola	4	Black-bellied Plover
		Corvus ossifragus	2	Fish Crow
		Agelaius phoenicius	1	Redwinged Blackbird
		Cassidix mexicanus	1	Boat-tailed Grackle
		Leucophoyx thula	1	Snowy Egret
		Phalacrocorax auritis	1	Double-crested Cormorant
	1630	Hydroprogne caspia	60	Caspian Tern
		Thalasseus maximus	60	Royal Tern
		Rallus longirostris	2	Clapper Rail
		Cassidix mexicanus	1	Boat-tailed Grackle
		Larus atricilla	1	Laughing Gull
		Squatarola squatarola	1	Black-bellied Plover
	1730	Thalasseus maximus	57	Royal Tern
		Squatarola squatarola	13	Black-bellied Plover
		Larus delawarensis	11	Ring-billed Gull
		Corvus ossifragus	4	Fish Crow
		Cassidix mexicanus	3	Boat-tailed Grackle
		Crocethia alba	3	Sanderling
		Agelaius phoenicia	1	Redwinged Blackbird
		Erolia alpina	1	Dunlin
		Erolia minutilla	1	Least Sandpiper
		Rallus longirostris	1	Clapper Rail
	1830	Hydroprogne caspia	34	Caspian Tern
		Squatarola squatarola	14	Black-bellied Plover
		Crocethia alba	5	Sanderling
		Larus delawarensis	4	Ring-billed Gull
		Corvus ossifragus	3	Fish Crow
		Cassidix mexicanus	1	Boat-tailed Grackle
		Erolia maritima	1	Least Sandpiper
		Rallus longirostris	1	Clapper Rail
	1930	Crocethia alba	70	Sanderling
		Charadrius semipalmatus	5	Semipalmated Plover
		Squatarola squatarola	5	Black-bellied Plover
		Larus delawarensis	2	Ring-billed Gull
		Cassidix mexicanus	1	Boat-tailed Grackle
		Erolia alpina	1	Dunlin
		Erolia maritima	1	Purple Sandpiper
		Larus argentata	1	Herring Gull
	2030	Corvus ossifragus	6	Fish Crow
		Cassidix mexicanus	2	Boat-tailed Grackle
		Crocethia alba	1	Sanderling
[illegible] June 1976	0630	Agelaius phoenicius	2	Redwinged Blackbird
		Rallus longirostris	2	Clapper Rail
		Leucophoyx thula	1	Snowy Egret
	0730	Cassidix mexicanus	2	Boat-tailed Grackle

Date	Time	Species	Number of Individuals	Common Name
30 June 1976	0730	Zenaidura macroura	2	Mourning Dove
		Corvus ossifragus	1	Fish Crow
		Nyctanassa violacea	1	Yellow-Crowned Night Heron
	0830	Agelaius pheonicus	3	Redwinged Blackbird
	0930	Cassidix mexicanus	3	Boat-tailed Grackle
		Leucophoyx thula	1	Snowy Egret
	1030	Corvus ossifragus	2	Fish Crow
	1130	Cathartes aura	2	Turkey Vulture
		Corvus ossifragus	1	Fish Crow
	1230	Corvus ossifragus	2	Fish Crow
		Agelaius phoenicius	1	Redwinged Blackbird
		Cassidix mexicanus	1	Boat-tailed Grackle
	1330	Corvus ossifragus	6	Fish Crow
		Agelaius phoenicius	1	Redwinged Blackbird
	1430	---------------------	-	-----------------------
	1530	Agelaius phoenicius	1	Redwinged Blackbird
		Leucophoyx thula	1	Snowy Egret
	1630	Corvus ossifragus	3	Fish Crow
		Agelaius phoenicius	2	Redwinged Blackbird
		Casmerodius albus	1	Common Egret
		Leucophoyx thula	1	Snowy Egret
	1730	Agelaius phoenicius	2	Redwinged Blackbird
		Corvus ossifragus	2	Fish Crow
		Leucophoyx thula	1	Snowy Egret
		Pandion haliaetus	1	Osprey
	1830	Corvus ossifragus	5	Fish Crow
		Nyctanassa violacea	2	Yellow-Crowned Night Neron
		Leucophoyx thula	1	Snowy Egret
		Rallus longirestris	1	Clapper Rail
	1930	Agelaius phoenicius	4	Redwinged Blackbird
		Rallus longirostris	3	Clapper Rail
		Leucophoyx thula	2	Snowy Egret
	2030	Agelaius phoenicius	4	Redwinged Blackbird
23 Sept. 1976	0700	Zenaidura macroura	16	Mourning Dove
		Cassidix mexicanus	5	Boat-tailed Grackle
		Agelaius phoenicius	4	Redwinged Blackbird
		Hydroprogne caspia	1	Caspian Tern
		Megaceryle alcyon	1	Belted Kingfisher
		Rallus longirostris	1	Clapper Rail

Date	Time	Species	Number of Individuals	Common Name
23 Sept. 1976	0800	Hydroprogne caspia	17	Caspian Tern
		Calidris canutis	4	Knot
		Cassidix mexicanus	4	Boat-tailed Grackle
		Crocethia alba	2	Sanderling
		Zenaidura macroura	1	Mourning Dove
	0900	Crocethia alba	30	Sanderling
		Calidris canutis	4	Knot
	1000	Crocethia alba	24	Sanderling
		Calidris canutis	4	Knot
		Actitis macularia	1	Spotted Sandpiper
	1100	Crocethia alba	24	Sanderling
		Calidris canutis	6	Knot
	1200	Crocethia alba	3	Sanderling
	1300	Crocethia alba	2	Sanderling
		Alligator mississippiensis	1	Alligator
		Casmerodius albus	1	Common Egret
		Leucophoyx thula	1	Snowy Egret
	1400	Crocethia alba	4	Sanderling
		Pandion haliaetus	1	Osprey
	1500	Crocethia alba	5	Sanderling
	1600	Crocethia alba	3	Sanderling
		Rhychops nigra	3	Black Skimmer
		Leucophoyx thula	1	Snowy Egret
		Zenaidura macroura	1	Mourning Dove
	1700	Charadrius semipalmatus	32	Semipalmated Plover
		Haematopus palliatus	22	American Oystercatcher
		Calidris canutis	5	Knot
		Megaceryle alcyon	1	Belted Kingfisher
		Squatarola squatarola	1	Black-bellied Plover
	1800	Haematopus palliatus	22	American Oystercatcher
		Charadrius semipalmatus	16	Semipalmated Plover
		Calidris canutis	6	Knot
		Megaceryle alcyon	1	Belted Kingfisher
		Squatarola squatarola	1	Black-bellied Plover
	1900	Corvus ossifragus	30	Fish Crow
		Cassidix mexicanus	22	Boat-tailed Grackle
		Zenaidura macroura	16	Mourning Dove
		Calidris canutis	5	Knot
		Squatarola squatarola	1	Black-bellied Plover

Date	Time	Species	Number of Individuals	Common Name
5 March 1977	0700	Thalasseus maximus	56	Royal Tern
		Larus argentatus	12	Herring Gull
		Cassidix mexicanus	3	Boat-tailed Grackle
		Calidris canutis	2	Knot
		Zenaidura macroura	2	Mourning Dove
		Charadrius vociferus	1	Killdeer
		Corvus ossifragus	1	Fish Crow
	0800	Larus delawarensis	49	Ring-billed Gull
		Larus argentatus	45	Herring Gull
		Thalasseus maximus	26	Royal Tern
		Hydroprogne caspia	9	Caspian Tern
		Calidris canutis	3	Knot
		Charadrius vociferus	1	Killdeer
		Leucophoyx thula	1	Snowy Egret
		Phalacrocorax auritis	1	Double-crested Cormorant
	0900	Larus argentatus	50	Herring Gull
		Larus delawarensis	37	Ring-billed Gull
		Thalasseus maximus	22	Royal Tern
		Charadrius vociferus	15	Killdeer
		Hydroprogne caspia	11	Caspian Tern
		Calidris canutis	3	Knot
		Phalacrocorax auritis	3	Double-crested Cormorant
		Corvus ossifragus	2	Fish Crow
		Haematopus palliatus	2	American Oystercatcher
		Cassidix mexicanus	1	Boat-tailed Grackle
		Zenaidura macroura	1	Mourning Dove
	1000	Larus delawarensis	42	Ring-billed Gull
		Larus argentatus	25	Herring Gull
		Thalasseus maximus	20	Royal Tern
		Hydroprogne caspia	13	Caspian Tern
		Calidris canutis	4	Knot
		Corvus ossifragus	2	Fish Crow
		Haematopus palliatus	2	American Oystercatcher
		Phalacrocorax auritis	2	Double-crested Cormorant
		Cassidix mexicanus	1	Boat-tailed Grackle
		Leucophoyx thula	1	Snowy Egret
		Zenaidura macroura	1	Mourning Dove
	1100	Larus delawarensis	42	Ring-billed Gull
		Larus argentatus	28	Herring Gull
		Thalasseus maximus	21	Royal Tern
		Hydroprogne caspia	14	Caspian Tern
		Casmerodius albus	9	Common Egret
		Calidris canutis	4	Knot
		Haematopus palliatus	2	American Oystercatcher
		Phalacrocorax auritus	1	Double-crested Cormorant
		Cassidix mexicanus	1	Boat-tailed Grackle
	1200	Larus delawarensis	29	Ring-billed Gull
		Larus argentatus	9	Herring Gull
		Hydroprogne caspia	4	Caspian Tern
		Thalasseus maximus	4	Royal Tern

Date	Time	Species	Number of Individuals	Common Name
[illegible]arch 1977	1200	Charadrius vociferus	2	Killdeer
		Cassidix mexicanus	1	Boat-tailed Grackle
		Zenaidura macroura	1	Mourning Dove
	1300	Larus delawarensis	2	Ring-billed Gull
		Cassidix mexicanus	1	Boat-tailed Grackle
		Leucophoyx thula	1	Snowy Egret
	1400	Larus argentatus	1	Herring Gull
		Leucophoyx thula	1	Snowy Egret
		Pandion haliaetus	1	Osprey
	1500	Casmerodius albus	1	Common Egret
	1600	Casmerodius albus	1	Common Egret
		Larus delawarensis	1	Ring-billed Gull
		Leucophoyx thula	1	Snowy Egret
	1700	Haematopus palliatus	48	American Oystercatcher
		Cassidix mexicanus	4	Boat-tailed Grackle
		Corvus ossifragus	3	Fish Crow
		Calidris canutis	2	Knot
		Larus argentatus	1	Herring Gull
		Leucophoyx thula	1	Snowy Egret
	1800	Corvus ossifragus	43	Fish Crow
		Cassidix mexicanus	11	Boat-tailed Grackle
25 May 1977	0630	Larus argentatus	3	Herring Gull
		Cassidix mexicanus	1	Boat-tailed Grackle
		Corvus ossifragus	1	Fish Crow
	0730	Pelicanus occidentalis	20	Brown Pelican
		Cassidix mexicanus	2	Boat-tailed Grackle
		Leucophoyx thula	2	Snowy Egret
		Larus argentatus	1	Herring Gull
	0830	Cassidix mexicanus	2	Boat-tailed Grackle
		Leucophoyx thula	1	Snowy Egret
		Rallus longirostris	1	Clapper Rail
	0930	Cassidix mexicanus	2	Boat-tailed Grackle
		Alligator mississippensis	1	Alligator
		Rallus longirostris	1	Clapper Rail
	1030	Sterna forsteri	9	Forster's Tern
		Haematopus palliatus	5	American Oystercatcher
		Larus atricilla	1	Laughing Gull
		Leucophoyx thula	1	Snowy Egret
	1130	Crocethia alba	25	Sanderling
		Larus atricilla	6	Laughing Gull
		Larus argentatus	3	Herring Gull
		Sterna hirundo	3	Common Tern
		Hydroprogne caspia	2	Caspian Tern

Date	Time	Species	Number of Individuals	Common Name
25 May 1977	1130	Sterna forsteri	2	Forster's Tern
		Thalasseus maximus	1	Royal Tern
	1230	Crocethia alba	80	Sanderling
		Hydroprogne caspia	60	Caspian Tern
		Thalasseus maximus	30	Royal Tern
		Sterna hirundo	4	Common Tern
		Sterna forsteri	3	Forster's Tern
		Corvus ossifragus	1	Fish Crow
		Larus atricilla	1	Laughing Gull
	1330	Hydroprogne caspia	150	Caspian Tern
		Thalasseus maximus	130	Royal Tern
		Corvus ossifragus	6	Fish Crow
		Larus atricilla	5	Laughing Gull
		Sterna forsteri	4	Forster's Tern
	1430	Hydroprogne caspia	150	Caspian Tern
		Thalasseus maximus	150	Royal Tern
		Larus atricilla	22	Laughing Gull
		Larus argentatus	3	Herring Gull
		Sterna forsteri	2	Forster's Tern
		Larus delawarensis	1	Ring-billed Gull
		Leucophoyx thula	1	Snowy Egret

Date	Time	Species	Number of Individuals	Common Name
29 May 1977	1530	Hydroprogne caspia	150	Caspian Tern
		Thalasseus maximus	150	Royal Tern
		Sterna forsteri	35	Forster's Tern
		Larus atricilla	20	Laughing Gull
		L. argentatus	5	Herring Gull
		Crocethia alba	1	Sanderling
		L. delawarensis	1	Ring-billed Gull
	1630	Hydroprogne caspia	500	Caspian Tern
		Thalasseus maximus	500	Royal Tern
		Crocethia alba	30	Sanderling
		Larus atricilla	20	Laughing Gull
		Sterna forsteri	8	Forster's Tern
		Larus argentata	2	Herring Gull
		Cassidix mexicanus	1	Boat-tailed Grackle
		Zenaidura macroura	1	Mourning Dove
	1730	Hydroprogne caspia	500	Caspian Tern
		Thalasseus maximus	500	Royal Tern
		Larus atricilla	16	Laughing Gull
		Sterna forsteri	10	Forster's Tern
		Corvus ossifragus	2	Fish Crow
		Crocethia alba	2	Sanderling
		Larus argentatus	1	Herring Gull
		Leucophoyx thula	1	Snowy Egret
	1830	Hydroprogne caspia	200	Caspian Tern
		Thalasseus maximus	200	Royal Tern
		Sterna forsteri	6	Forster's Tern
		Larus atricilla	5	Laughing Gull
		Larus argentata	3	Herring Gull
		Cassidix mexicanus	2	Boat-tailed Grackle
		Sterna hirundo	1	Common Tern
	1930	Cassidix mexicanus	5	Boat-tailed Grackle
		Thalasseus maximus	3	Royal Tern
		Corvus ossifragus	1	Fish Crow
		Leucophoyx thula	1	Snowy Egret
		Rallus longirostris	1	Clapper Rail
		Rhyncops nigra	1	Black Skimmer
		Sterna forsteri	1	Forster's Tern
	2030	Cassidix mexicanus	20	Boat-tailed Grackle
		Corvus ossifragus	3	Fish Crow
		Rallus longirostris	2	Clapper Rail
		Leucophoyx thula	1	Snowy Egret
27 June 1977	0630	Corvus ossifragus	3	Fish Crow
		Cassidix mexicanus	2	Boat-tailed Grackle
		Lanius ludovicanus	1	Loggerhead Shrike

Date	Time	Species	Number of Individuals	Common Name
27 June 1977	0730	Agelaius phoenicius	2	Redwinged Blackbird
		Cassidix mexicanus	2	Boat-tailed Grackle
		Rallus longirostris	2	Clapper Rail
		Lanius ludovicianus	1	Loggerhead Shrike
	0830	Thalasseus maximus	2	Royal Tern
		Pelicanus occidentalis	1	Brown Pelican
	0930	Leucophoyx thula	1	Snowy Egret
	1030	Rallus longirostris	2	Clapper Rail
		Leucophoyx thula	1	Snowy Egret
		Rhyncops nigra	1	Black Skimmer
	1130	Rallus longirostris	3	Clapper Rail
		Rhyncops nigra	3	Black Skimmer
		Leucophoyx thula	2	Snowy Egret
		Cassidix mexicanus	1	Boat-tailed Grackle
	1230	Rallus longirostris	3	Clapper Rail
		Cassidix mexicanus	1	Boat-tailed Grackle
		Leucophoyx thula	1	Snowy Egret
	1330	Rallus longirostris	3	Clapper Rail
		Cassidix mexicanus	2	Boat-tailed Grackle
		Corvus ossifragus	1	Fish Crow
		Nyctanassa violacea	1	Yellow-crowned Night Heron
	1430	Rallus longirostris	4	Clapper Rail
		Corvus ossifragus	2	Fish Crow
		Cassidix mexicanus	1	Boat-tailed Grackle
	1530	Cassidix mexicanus	1	Boat-tailed Grackle
		Leucophoyx thula	1	Snowy Egret
		Rallus longirostris	1	Clapper Rail
	1630	Alligator mississippiensis	1	Alligator
		Pelicanus occidentalis	2	Brown Pelican
	1730	Corvus ossifragus	3	Fish Crow
		Cassidix mexicanus	2	Boat-tailed Grackle
		Agelaius phoenicius	1	Redwinged Blackbird
		Leucophoyx thula	1	Snowy Egret
		Rallus longirostris	1	Clapper Rail
	1830	Agelaius phoeniceus	5	Redwinged Blackbird
		Cassidix mexicanus	3	Boat-tailed Grackle
		Corvus ossifragus	2	Fish Crow

Date	Time	Species	Number of Individuals	Common Name
27 June 1977	1930	Cassidix mexicanus	6	Boat-tailed Grackle
		Agelaius phoeniceus	2	Redwinged Blackbird
		Corvus ossifragus	1	Fish Crow
		Leucophoyx thula	1	Snowy Egret
		Zenaidura macroura	1	Mourning Dove
	2030	Iridoprocne bicolor	12	Tree Swallow
		Cassidix mexicanus	5	Boat-tailed Grackle
		Agelaius phoeniceus	4	Redwinged Blackbird
25 July 1977	0630	Agelaius phoeniceus	8	Redwinged Blackbird
		Ardea herodias	2	Great Blue Heron
		Rallus longirostris	1	Clapper Rail
		Alligator mississippiensis	1	Alligator
	0730	Agelaius phoeniceus	10	Redwinged Blackbird
		Pelicanus occidentalis	10	Brown Pelican
		Nyctanassa violacea	1	Yellow-Crowned Night Heron
		Alligator mississippiensis	1	Alligator
	0830	Cassidix mexicanus	4	Boat-tailed Grackle
		Haematopus palliatus	3	American Oystercatcher
		Nyctanassa violacea	2	Yellow-Crowned Night Heron
		Crocethia alba	2	Sanderling
		Pandion haliaetus	1	Osprey
	0930	Pelicanus occidentalis	5	Brown Pelican
		Rallus longirostris	3	Clapper Rail
		Cassidix mexicanus	2	Boat-tailed Grackle
		Rhyncops nigra	2	Black Skimmer
		Casmerodius albus	1	Common Egret
		Nyctanassa violacea	1	Yellow-Crowned Night Heron
	1030	Agelaius phoeniceus	1	Redwinged Blackbird
		Alligator mississippiensis	1	Alligator
		Leucophoyx thula	1	Snowy egret
		Nyctanassa violacea	1	Yellow-Crowned Night Heron
		Rallus longirostris	1	Clapper Rail
	1130	Rallus longirostris	4	Clapper Rail
		Agelaius phoeniceus	1	Redwinged Blackbird
		Nyctanassa violacea	1	Yellow-Crowned Night Heron
	1230	Rhyncops nigra	1	Black Skimmer
	1330	Rallus longirostris	1	Clapper Rail
	1430	Sterna forsteri	2	Forster's Tern
		Agelaius phoeniceus	1	Redwinged Blackbird
	1530	Agelaius phoeniceus	1	Redwinged Blackbird

Date	Time	Species	Number of Individuals	Common Name
25 July 1977	1630	-----people on site-----	---	--------------------
	1730	Cassidix mexicanus	1	Boat-tailed Grackle
	1830	Agelaius phoeniceus	1	Redwinged Blackbird
		Corvus ossifragus	1	Fish Crow
	1930	Agelaius phoeniceus	35	Redwinged Blackbird
		Corvus ossifragus	7	Fish Crow
		Rallus longirostris	2	Clapper Rail
	2030	Crocethia alba	7	Sanderling
		Agelaius phoeniceus	4	Redwinged Blackbird
		Rhyncops nigra	1	Black Skimmer
[illegible] Oct. 1977	0730	Cassidix mexicanus	1	Boat-tailed Grackle
		Hydroprogne caspia	1	Caspian Tern
	0830	Circus cyaneas	1	Marsh Hawk
	0930	Cassidix mexicanus	1	Boat-tailed Grackle
	1030	Cassidix mexicanus	9	Boat-tailed Grackle
	1130	Ammospiza maritima	1	Seaside Sparrow
		Cassidix mexicanus	1	Boat-tailed Grackle
	1230	Ammospiza maritima	6	Seaside Sparrow
		Leucophoyx thula	1	Snowy Egret
	1330	Ammospiza maritima	4	Seaside Sparrow
	1430	Ammospiza caudacuta	4	Sharptailed Sparrow
	1530	Falco columbaris	1	Pigeon Hawk
	1630	Alligator mississippiensis	1	Alligator
		Circus cyaneus	1	Marsh Hawk
	1730	Leucophoyx thula	1	Snowy Egret
	1830	Corvus ossifragus	250	Fish Crow